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GARBAGE

THE PRACTICAL JOURNAL FOR THE ENVIRONMENT

GLOBAL WARMING

The Theory that Became Fact

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Cover illustration by
Victoria Kann

Back cover illustration
by Leslie Cober

GARBAGE The Practical Journal for the Environment ISSN 1044-3061 is published bi-monthly for \$21 per year by Dovetail Publishers, 2 Main St., Gloucester, MA 01930. Telephone (508) 283-3200. Subscriptions in Canada are \$29 per year, payable in U.S. funds.

Second-class postage paid at Gloucester, MA and at additional entries. POSTMASTER: Send address changes to GARBAGE, PO Box 56519, Boulder, CO 80322.



The World is in our Hands

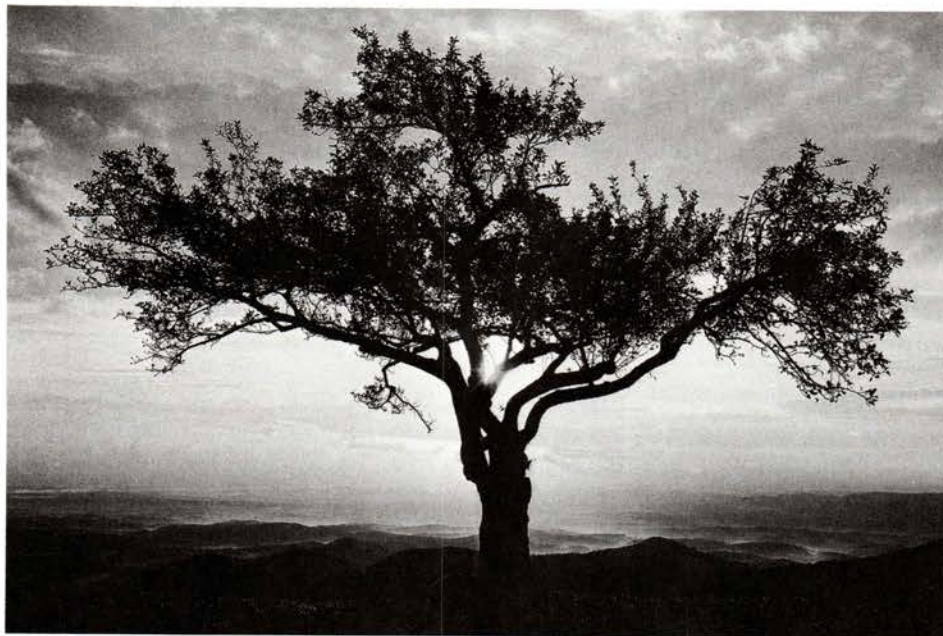
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PAPER

CROSS-POINT

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It's a fact. American homes contain dozens of household waste products. A lot of that seemingly harmless stuff we've got lying around the garage, basement and under the kitchen counter is dangerous hazardous waste. It is estimated that the average household contains ten to fifteen gallons of waste materials.

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Who Reads GARBAGE?

WHEN A BIG MAGAZINE IS LAUNCHED, IT HAS SOME things in common with a commercial movie release — the publisher, or producer, has targeted a relatively homogeneous audience, and a large one. The immediate need of larger ventures to reach a mass market puts a lot of emphasis on early market research,

and imposes constraints on the editor. Smaller, independent magazines have a different lifecycle. They're like a game of ping-pong. *Ping!* the founder lobs a ball over the net... *pong!* the readers return it. If the volleys continue, the game picks up.

Here's a look at what's going on three years into our game. The GARBAGE audience is about evenly split between "consumer" (the general reader) and "trade" (those with a business connection). Our trade readers are not homogeneous, however, as they would be in a true "trade magazine." They're as diverse as the general readers: waste managers, environmental planners, lobbyists, legislators, water and sewer experts, corporate environmental directors, recycling managers.

I'd put two other large blocs of readers on the trade side, too: educators and media. University professors in science and politics, as well as a fair number of school science teachers, read GARBAGE. And we're under 'G' in many a media Rolodex: tv, radio, journals, and newspapers. That's apparent not only from the exposure we get, but also from the research calls coming into this office.

Small magazines don't always run according to established publishing norms. Take newsstand distribution, for example. Even *Old-House Journal*, our mature, straightforward sister publication, has had our distributors gnashing teeth. (It's what they call

a "shelter magazine," and, generally speaking, they're supposed to be for the boys or for the girls. *OHJ* is evenly split — 50/50 male/female readers — so there's been a lot of angst over the years of whether to cozy it up to the hammer-and-nails crowd or the kitchens-and-drapery crowd.)

The demographics of GARBAGE are anathema to mass distribution. "OK," our distributor proposes, "do you think you should be next to *Omni* [that's science], *Sierra* [environmentalism], *New Republic*

[politics], or *Kayaking* [outdoors]?"

I explain the editorial mission and list upcoming articles.

She purses her lips. "Put it under 'thought leader,'" she directs her assistant. I'm pretty sure that means "miscellaneous." But I'm an editor, and I like it.

.....

OUR VOLUME OF MAIL HERE AT GARBAGE IS extraordinary. I can't answer every correspondence, but I want all those who've written to know that each letter is read and circulated among the editors. Thank you for writing! The different disciplines represented and the many viewpoints expressed contribute immeasurably to our understanding of environmental complexities. This office is always a clearing-house, and often a lightning rod — and it's a wonderful vantage point to have.

In the next issue of GARBAGE

DOING IT

A User's Guide to Photovoltaics

Solar power is already here, and it's versatile, convenient, and workable. It's even cost-effective for limited applications, or if your site isn't on the electric-power grid. Here's a down-to-earth approach to photovoltaics, for those of you who want to play with it before PV goes mainstream. Which it will.

THE REAL WORLD

Telecommuting

Computers, faxes, modems... they've made it possible to work from a remote location (like home). Thousands of companies have moved from urban centers, and thousands of former commuters have removed themselves from smogged, clogged highways. We'll hear about telecommuting's benefits, its pitfalls, and the trend from people who do it.

SPEAKING FOR SCIENCE

Animal Testing & the Environment

Any discussion of human toxicology makes reference to animal experiments. What is the efficacy of testing on animals? Has the animal-rights movement blocked research?

SPECIAL REPORT

Eco-Education: Is It Natural Science — Or Propaganda?

"The environment" becomes a curriculum topic all its own, but the textbooks (and the development budgets) aren't there. Enter special interests, from activist groups to corporations, to fill the need. Ecology class isn't about watersheds or photosynthesis anymore; it's about sorting your garbage. America isn't the hope of the future anymore; it's a gluttonous society whose time is up. *What's going on here?*

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GARBAGE THE PRACTICAL JOURNAL FOR THE ENVIRONMENT is published by Dovetale Publishers, 2 Main St., Gloucester, MA 01930. Telephone (508) 283-3200. Advertising: (508) 283-4721. Newsstand sales: (508) 283-3200. Letters to the editor and author's story queries should be sent to editorial offices, noted above. Publisher disclaims all responsibility to return unsolicited editorial and graphic matter. Letters to GARBAGE magazine and its editors become the property of GARBAGE. Articles appearing in GARBAGE are indexed in *Environmental Periodicals Bibliography*, Environmental Studies Institute, 800 Garden St., Suite D, Santa Barbara, CA 93101; (805) 965-5010.

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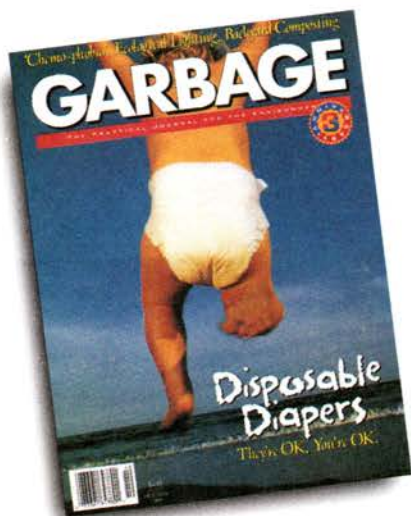
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LETTERS

NOTE: Because of our shift in publication dates, we were still getting your letters related to the "Diapers" issue (Oct/Nov '92) when this one went to press. Look for commentary on our "Packaging" issue (Dec/Jan '93) next time.

Split Opinion

PLEASE CANCEL MY SUBSCRIPTION AND REFUND my money in full. I read enough of this kind of crap everywhere. The new direction the magazine has taken ("No More Pulling Punches" Oct/Nov '92) is really "Poore," and now it truly is GARBAGE.

JULI PURYEAR
Cedar Ridge, Calif.

I BOUGHT A COPY OF GARBAGE AT A BOOKSTORE magazine rack a few days ago. At last! The voice of reason! I hope GARBAGE will neutralize some of the mindless zealotry that passes for environmental concern.

ERICH KERN
Lake Elsinore, Calif.

WHAT'S INTERESTING, OF COURSE, IS THAT YOU would think that anyone *besides* environmentalists would be much interested in your magazine. To brow-beat them (calling them "righteous," "unscientific," and "propagandists" in the same issue!) is simply cutting off your nose (and subscribers) to spite your face.

SCOTT DAVIS JONES
No. Hollywood, Calif.

HOORAY! A STANDING OVATION! I TRULY appreciate your courage. I'm sure your hate mail will increase initially, but as concerned and productive individuals find the time to

write, they will acknowledge you for taking the time to educate yourself. Idealistic hopes and undereducated (emotional) information has served its purpose to focus attention on the environment. It is time that someone focused on cleaning up misinformation and obvious bias.

ALAN W. GOLDSBERRY
Houston, Texas

HAVING WORKED IN PUBLIC RELATIONS IN New York for "both sides" of the environmental issue, I share your frustration with the fanatical attitude of many environmentalists that all corporations are evil by virtue of being corporations. I experienced firsthand the effect this has on corporate executives, who have come to believe that they can't win and so shouldn't bother playing.

Living in Boulder, that bastion of socially correct living, I'm exposed daily to the self-righteousness of grassroots environmentalists — people who don't hesitate to condemn disposable-diaper users, despite the fact that Colorado suffers from water shortages. How will we ever change the way we live when the groups professing to steward the environment care more about being "right" than being accurate?

KAREN DIVINCENT
Boulder, Colo.

YOUR EDITOR'S PAGE WAS REFRESHING, HONEST, pragmatic journalism. Too many journals have sunk to promoting a one-sided, environmentalist agenda which distorts the facts, ignores the reality of moving 250 million people to more responsible life styles, and promotes behavior which is not practical and sustainable.

The early issues of GARBAGE were a bit on the fringe with a panicky, angry tone. Your more recent tone and content have been a pleasant improvement. I will continue to renew my subscription and to circulate my copy to key managers in our company.

JAMES M. ROSSMAN
President, Chris Craft, Inc.
Northbrook, Ill.

AS A PROFESSIONAL IN THE GEOSCIENCE AND environmental fields, the more I learn about

the environmental impact of our industrial society, the less we collectively seem to know about leading the world into an environmentally benign way of life.

At the same time, I have become increasingly skeptical of the hypocritical and reactionary population of environmental vigilantes. These people give a lynch-mob, fanatical reputation to all environmentalists in the eye of an objective public.

Patricia Poore's article is a gutsy call for us all to objectively consider environmental issues after first hearing the facts, not just subscribe to a stand out of somebody's idea of correctness.

HENRY H. HASELTON
Seattle, Wash.

AT LONG LAST, SOMEONE WITH YOUR POSITION and standing in the environmental-support community has finally acknowledged the "tyranny" of certain elements within the environmental movement.

It has become increasingly apparent to me that certain conservation groups, with powerful lobbying arms, are providing outdated and self-serving arguments for bans on a variety of products and services which have little or no impact in the scheme of global degradation of our environment.

It is time that we recognize the outstanding contributions of these organizations in the past for providing a compelling agenda for change. It's equally important that [we] rely on scientific evidence rather than the emotional and oftentimes incorrect solutions offered by advocacy groups.

THEODORE P. DONOHUE, JR.
President, Earthwise, Inc.
New York, N.Y.

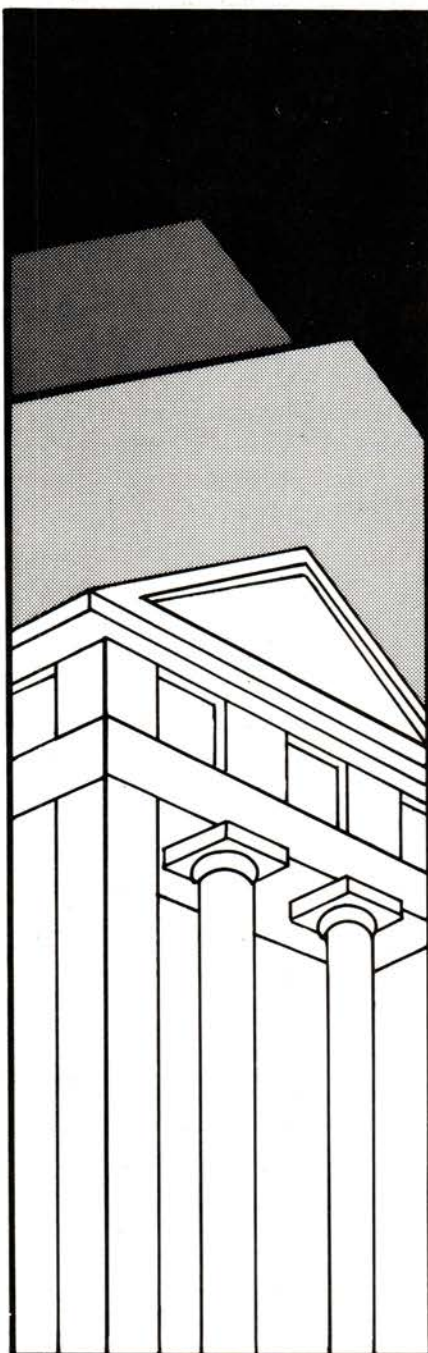
Diaper Wars, Round 2

WHAT A SHAME THAT GARBAGE HAS BECOME the latest forum for the growing backlash against the environmental movement ("Disposable Diapers Are O.K." Oct/Nov '92). To us, it looks as though GARBAGE has become an apologist for the disposables industry.

Procter & Gamble, which controls about half of the \$4 billion diaper industry, is

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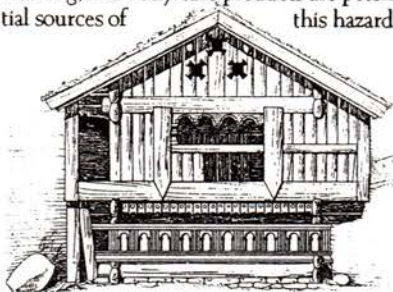
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pursuing shameless tactics to make the world safe for disposable diapers. Luckily, the City of New York wasn't fooled when, in March 1991, P&G was slapped with a fine for advertising its diapers as "compostable" when virtually none of the city's residents had access to such a facility. In Connecticut this year, environmentalists lobbying for a bill to allow cloth diaper use at day care centers discovered that the day care association lobbying against the bill was funded by P&G.

These facts show that P&G, rather than environmentalists, are using "propaganda" to protect their market share. If Ms. Poore thinks that challenging these tactics is "vigilante environmentalism," we need more of it.

[Ms. Poore] is fueling the fire of the backlash against environmentalism by parroting the solutions offered by the likes of "garbologists" and free-market think tanks.

ELIZABETH COLLATON
Environmental Action Foundation
Takoma Park, Maryland

YOU WROTE "ALL PROCTER & GAMBLE NEEDED to convince me was their product," and mentioned Pampers and Ivory soap. So would it be safe to assume that Procter & Gamble could be a future advertising client? You should know that greedy megacorporations such as Procter & Gamble purposefully inject cancer-causing dioxins into disposable diapers and maybe a decade into the future our sons will be dying from scrotum cancer.

You deserve a slap on the wrist for your myopic view.

I. DAVIDSON
Calgary, Alberta

YOUR DIAPER ARTICLE MADE ME WANT TO cry. You must be one more person receiving a payoff from the megacorp manufacturers of disposables. Whether this is true or not, you should be ashamed!! It is obvious that you have no respect for the environment.

There *really* are potential health risks associated with using paper diapers, starting with the dioxin in the paper which sits next to baby's skin 24 hours a day for 2-3 years. This is not meant to scare parents into choosing cloth, but to inform parents — as they deserve to be informed — about potential

health risks that should be taken into account when they make their diapering choice.

Your diaper article has destroyed your credibility. Disposable diapers are *not* ok.

SUSAN VERVER
No. Vancouver, B.C.

CONGRATULATIONS! TOO OFTEN THE VOICES of genuine environmentalism are intimidated by the mavens of "environmental correctness."

Symbolism is important, but symbols are meaningful only if they are connected to reality. The campaign against disposable diapers fools consumers of cotton diapers into imagining that they have "done something" for the environment, when in fact the choice makes almost no environmental difference.

A key step in helping people make responsible decisions is helping consumers see beyond the symbolic silliness of environmental correctness.

DAVE B. KOPEL
Golden, Colo.

MS. POORE HAS APPARENTLY ADOPTED BILL Rathje as her personal oracle. Unlike us "vigilante environmentalists," presumably Mr. Rathje is never mistaken and has no personal axe to grind. It might pay, Ms. Poore, to ask yourself just what we environmentalists *do* have our sights set on. Not some company's bottom line, or the future source of our research funding, that much is certain.

JANET BANTIN
Greenbank, Ontario

I HAVE BEEN INVOLVED IN RECYCLING FOR OxyChem for seven years. I wanted to praise your article on disposable diapers. There are certain topics where the correct response is, "This one looks like a draw. Enough already." For diapers, that is the correct response in my book.

If you never get another note of praise, you have one. I suggest you not publish this letter from someone who could be considered an "industry spokesmutant," lest you soil your credibility further.

DR. WILLIAM F. CARROLL, JR.
Dallas, Texas

THE OCT/NOV 1992 COVER PICTURE MAY BE

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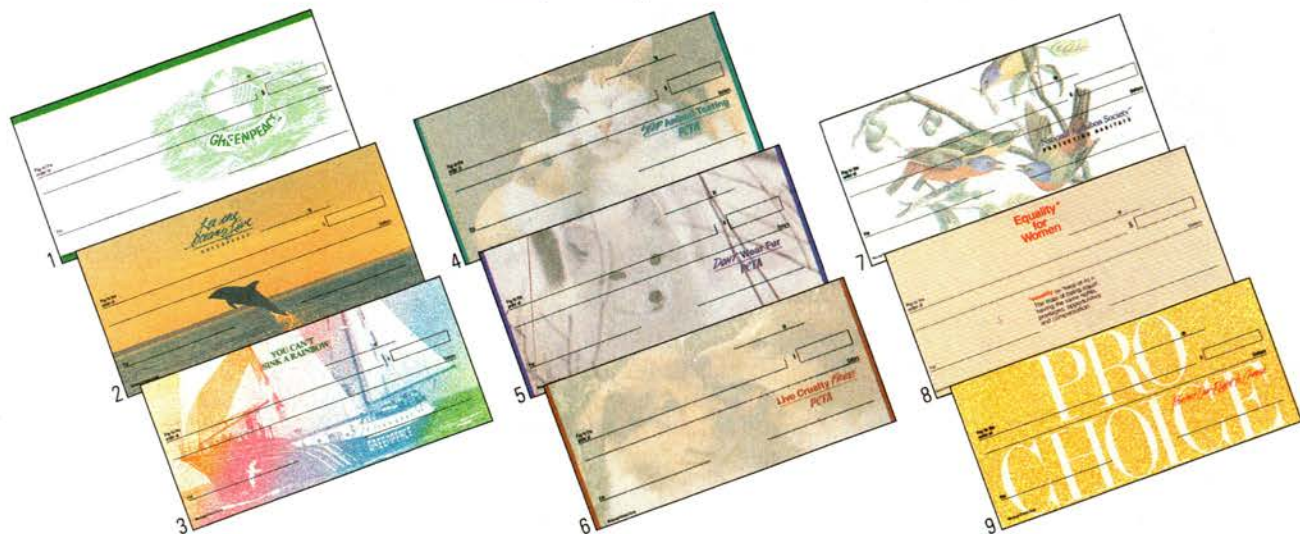
Steve Sawyer, Executive Director, Greenpeace Int'l.

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Alex Pacheco, PETA Chairperson

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Molly Yard, President, NOW



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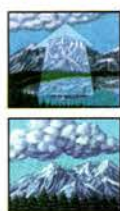
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symbolic more of an infant's first step, than for the diaper he wears. It can be the "first step" of a committed environmental movement: to research issues, to debate, to compromise, and to progress.

NEIL R. MOHR
 Laguna Niguel, Calif.

And Furthermore...

THE OCT/NOV ISSUE SHOCKED ME BY INCLUDING an ad from Working Assets with the heading "Pro-Choice Choice." To what particular environmental issue is this ad related? Fetuses as garbage, perhaps? Or, maybe, it relates to your focus this issue on diapers — you can *choose* to have an abortion to save the environment the stress of either cloth or disposable. Certainly the recycling of fetal tissue is a timely topic.

What you appear to be is a knee-jerk liberal lucratively turning your magazine into another mouthpiece for liberal groupthink.

MALLORY CRAWFORD
 West Hartford, Conn.

Chemical Reaction

YOUR EXPERT REASSURES US ("THE DOSE Makes the Poison" Oct/Nov '92) that "the fact that standards for chemical exposures have worked well in protecting individual and public health is demonstrated by the fact that, in countries where they are enforced, people in general live longer and healthier lives." This is like taking credit for the sun coming up. Any public-health textbook will affirm that better diets and infectious disease control are the principal reasons for increased longevity.

Contrary to the allegations in the article, concern [about chemicals in the environment] is certainly a legitimate response, and more research and prevention work remains to be done. In my view, existing evidence obviates the kind of industrial-strength, blanket reassurances about the safety of environmental chemical exposures in "The Dose Makes the Poison."

LARRY J. CHAPMAN
 Madison, Wisconsin

CORRECTION: On the chart "Environmental Costs of Packaging" (p. 26 Dec/Jan '92), the cost-per-package should be indicated in cents, not dollars.

A WORLD RESOURCES INSTITUTE GUIDE TO THE ENVIRONMENT

CAR TROUBLE

How new technology, clean fuels, and creative thinking can revive the auto industry and save our cities from smog and gridlock

STEVE NADIS AND JAMES J. MACKENZIE

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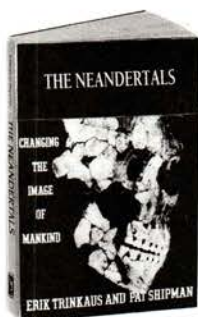
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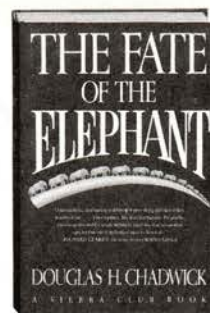
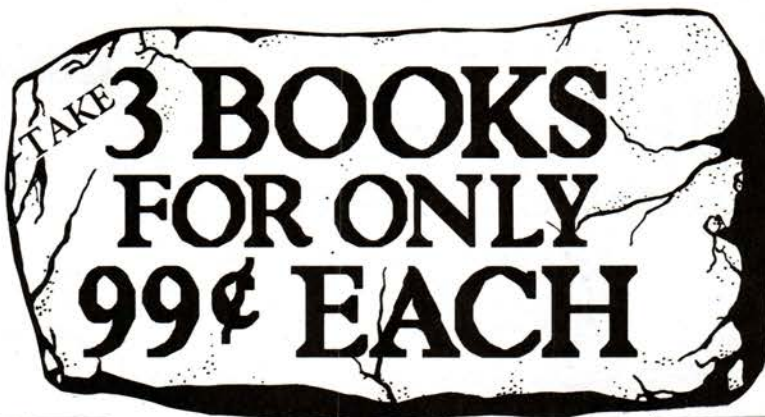
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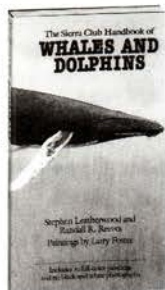
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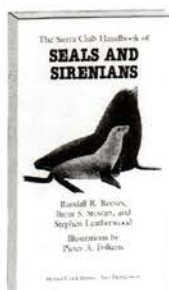
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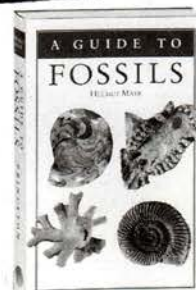
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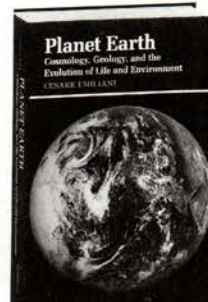
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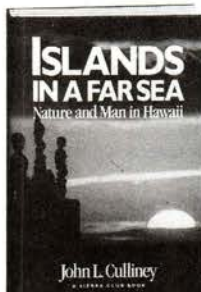
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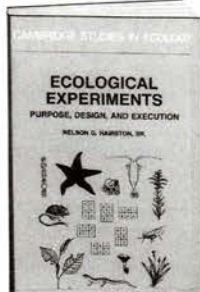
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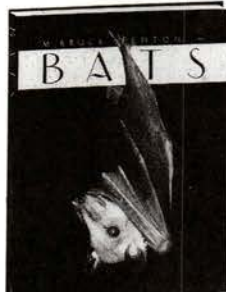
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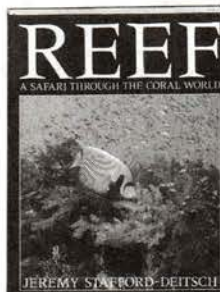
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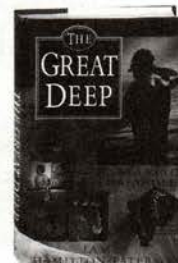
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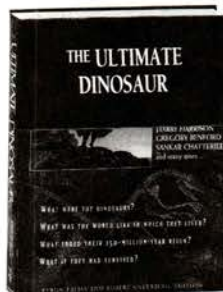
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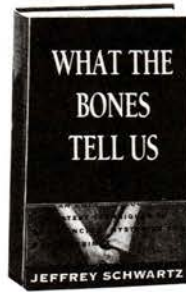
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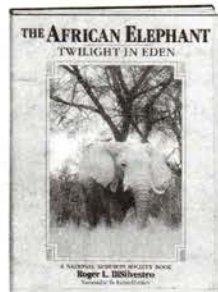
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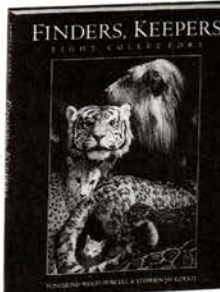
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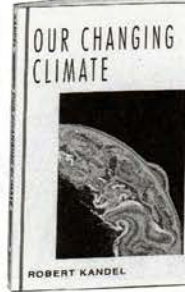
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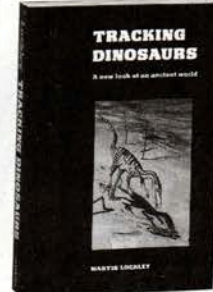
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Garbage 2/93

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RECYCLING

Getting Good Grease

WAYNE SHANHOLTZ SWINGS HIS MACK truck into a Vienna, Va., parking lot that backs a branch of the Chili's restaurant chain. Donning rubber gloves, he climbs down from the cab.

And there it is. He heaves the lid off a waist-high black dumpster, revealing not trash but a waxy substance the color and texture of coffee yogurt: congealed cooking grease, discarded after having done its time in Chili's deep-fat fryers. Wayne inspects the contents with approval. Here's a man who appreciates quality grease.

Wayne is a veteran grease collector. By the time his day ends, he will have logged as many as 450 miles, roaming the byways of northern Virginia in search of used grease from the fryers of fast-food outlets, Chinese restaurants, rib joints, tony inns, and strip bars. On a good day, he'll bring a Winchester, Va., rendering company called Valley Proteins as much as 25,000 pounds of somewhat raunchy, secondhand cooking oil mixed with egg shells, lettuce, grille scrapings, beer cans, and burger buns.

To the rest of us, worn-out restaurant grease isn't worth a soggy french fry. But to Wayne it's a paycheck — and to Valley Proteins, it's brown gold. The company buys the stuff from restaurants and

resells it at a higher price after removing the debris. Though no longer fit for human consumption (if it ever was), recycled grease is a key ingredient in poultry and cattle feed.

On the highways of northern Virginia, Wayne has seen the state of American dining, and it is greasy. Behind almost every establishment, from Chinese carryouts to the McDonald's, Wendy's, and Burger Kings dotting the suburban roadways like suction cups on an octopus, lurks some form of grease bucket. Back there, among the trashcans and propane tanks, one can find 55-gallon barrels or larger tanks brimming with evidence that America still likes its food fried. Statistics compiled by the Labor Department bear this out: More than half of Amer-

ican adults stop in to a fast-food joint for a weekly McLube job.

All this discarded grease — about 2.4 billion pounds per year, according to *Render*, a trade magazine which published the only definitive grease study ever undertaken — represents an ecological disaster waiting to happen. "This stuff has to be dealt with," says Kent Brady, marketing director for the National Renderer's Association. "You can't throw it away. You can't flush it down the drain."

Special traps in restaurant vents and floor drains keep used grease from escaping into the atmosphere or waterways. Disturbingly, the human body is about the only place it is [Cont. on p.16]



BIOREMEDIATION

[Cont. from p.15] allowed to go. And America's prime grease repository — the ample rumps of its citizenry — is already full.

A world without grease recyclers would be a grim place. If dumped down sewers wholesale, discarded grease could wipe out centuries of progress in public sanitation. That calamity was visited upon Reno, Nev., when a casino quit paying to have its grease hauled away, and instead put it in dumpsters with regular trash. Unfortunately, about 10,000 pounds leaked out into the street and clogged the sewers.

Warns Kent Brady: "Grease has to be put to some practical use."

Most of it is. Our national grease glut has given rise to one of the weirdest recycling industries around, and also one of the most efficient (it thrives without subsidies or legal coercion). Back in the 1950s, as America was just beginning its romance with fried food, the rendering industry headed off a grease crisis by devising a second use for the cruddy brown goop. Today, about 200 companies like Valley Proteins collect the stuff and recycle it into chickens. Today's baby Purdue broiler, unlike its scrawny forebears, is genetically programmed to become oven-stuffing obese in just 140 days. It can make weight only on a nutritious diet of rendered grease.

Other users of recycled grease include the steel industry, which uses a small amount to lubricate sheet steel. And Louis Wichinsky, a septuagenarian inventor living in upstate New York, siphons expired vegetable oil into the fuel tank of his converted Volkswagen Rabbit. On good grease, he gets 54 miles to the gallon.

— Bill Gifford

BILL GIFFORD IS ASSOCIATE EDITOR OF THE WASHINGTON CITY PAPER. HIS ARTICLES ON THE ENVIRONMENT HAVE ALSO APPEARED IN OUTSIDE AND ROLLING STONE.

Grease Disposal: A Microbial Feast

DOUG SCOTT HAD A PROBLEM, AND THE problem was grease.

For the past two years, Doug and his wife have owned the Havana Street Restaurant in Aurora, Colo., outside of Denver. He serves American family food with a Southwestern accent: sirloin and prime rib side-by-side with taco salads and burritos.

Such a meaty menu makes for a lot of leftover grease. To get rid of it, Doug hired a collecting service to pump his grease trap, a 200 gallon, eight-foot deep tank buried just beyond his back door. The prep and pot-washing sinks, which generate most of the grease problem, drain into the trap, and so do the floor drains. (By the end of a working day, even the cleanest commercial floor has the lubricated feel of Crisco underfoot.) With 2,500 meals a week coming out of the kitchen, about 100 gallons of used grease had to come out of the trap, every 90 days. Doug spent \$280 a year to have it pumped and hauled away.

Then Doug got a letter from the Denver franchise of Environmental Biotech, Inc. (EBI). The letter promoted the firm's bioremediation system, which uses bacteria to gobble grease. EBI's system includes a salad of 13 species of vegetative bacteria, which reproduce by dividing into daughter cells. Every two hours, a pump injects live bacteria into a restaurant's drains. The bacteria digest grease into CO₂ and water. EBI replenishes the bacteria every two weeks.

Bill Hadley is EBI's baron of bacteria.

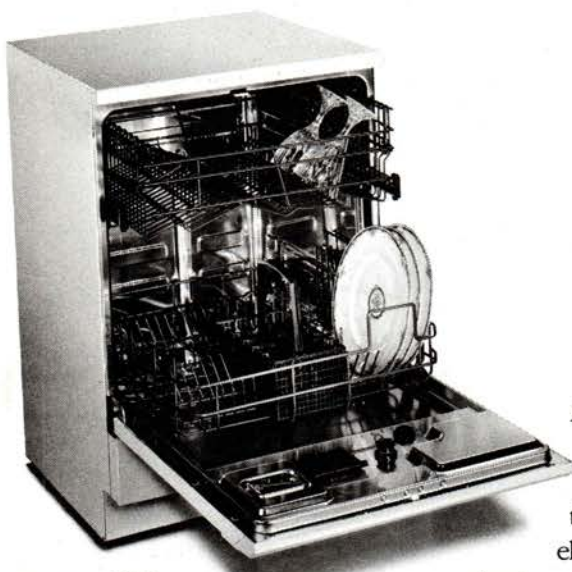
An entrepreneur with a background in petrochemicals and real-estate development, he acquired EBI's technology seven years ago from a company in Sarasota, Fla. Mr. Hadley invested \$6.8 million in further research and began marketing his system three years ago.



Since April 1991, 35 franchises have been established nationally. But in Denver, at least, the jury is still out on whether microbes are mighty enough to handle the city's grease glut.

EBI's Denver franchise attempted a test of its system at the Metropolitan Wastewater Reclamation District, the sewage plant that treats Denver's wastewater. It's also the place where Denver's collectors [Cont. on p.19]

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The Garbage Index

Scoop on Poop

Estimated number of municipal wastewater-treatment plants in U.S.: **15,000**

Estimated amount of wastewater treated daily at public sewage plants: **30 billion gallons**

Portion of U.S. households with septic and other onsite systems: **25%**

State with highest percentage of households using septic tanks: **Vermont**

State with highest percentage of households connected to central sewers: **California**

Amount of U.S. sewage sludge produced annually: **110-150 million wet metric tons**

Amount of toilet paper used in U.S., 1991: **2,343,000 tons**

Typical daily cost of municipal wastewater treatment per household: **\$0.27 per household**



Sources: Water Environment Federation, EPA National Small Flows Clearinghouse, EPA, American Paper Institute

Facts on Forests

Approximate portion of federally designated wilderness located in Alaska: **75%**

Approximate portion located east of the Mississippi River: **4.5%**

Approximate portion of eastern designated wilderness located in Everglades National Park: **50%**

Number of states lacking federally designated wilderness: **5**

Size of the nation's largest designated wilderness area¹: **9.08 million acres**

Size of the smallest²: **2 acres**

Number of designated wilderness areas (in the lower 48) larger than Rhode Island: **4**

Portion of Nevada owned by the federal government: **87%**

Approximate portion of Maine that's privately owned: **84%**

Portion of Maine that's forested: **90%**

Portion of Maine woods that is harvested for forest products: **97%**

Sources: The Wilderness Society, Beyond the Beauty Strip (Tilbury House Publishers)

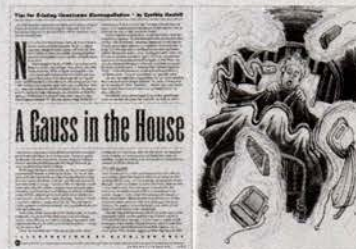
¹Alaska's Wrangell-St. Elias National Park and Preserve

²Wisconsin Island National Wildlife Refuge

"A Gauss in the House" (Jan/Feb '92) Two studies by Swedish researchers, published this past fall, report the most direct correlation to date between prolonged exposure to high-tension electricity lines and increased incidence of leukemia, particularly among children.



Epidemiologists at Stockholm's Karolinska Institute studied 436,503 people who had lived for at least a year within 300 meters of high-tension lines between 1960 and 1985. The study documented 142 cases of childhood leukemia — significantly higher than the 3.3 cases per 100,000 people incidence rate of childhood leukemia in the U.S. Researchers also found that the risk of contracting the disease grew in proportion to the strength of the electromagnetic field. A second study, by Sweden's National Institute of Occupational Health, documents a link between occupational exposure to electromagnetic radiation and leukemia in adult men.



The reports have prompted the Swedish government to study whether new regulations are needed for governing the proximity of new homes, schools, and day-care centers to power lines.

"Burn It?" (March/April '91) Dealing with the growing mounds of ash produced by trash-to-energy plants continues to evoke a spasm of passing-the-buck among the federal government and the courts. Environmentalists contend that heavy metals in incinerator ash qualify much of it as hazardous waste. The trash-to-energy industry argues that ash is benign enough to be buried in standard, MSW landfills.

Congress avoided the issue by failing to complete reauthorization of the Resource Conservation and Recovery Act, which could have established whether ash is a hazardous waste. On the judicial side, in separate 1991 cases the Seventh Circuit Court of Appeals ruled that ash should indeed be treated as hazardous, while the Second Circuit ruled just the opposite.

The Seventh Circuit case went to the Supreme Court for review. The Court asked the Justice Department for its opinion, and Justice turned to the EPA. The EPA issued a policy stating that ash should be exempt from hazardous-waste regulation. Citing the EPA statement, Justice recommended to the Supreme Court that the case be sent back to the Seventh Court. The Supreme Court agreed. The Seventh Court stuck to its original opinion, which is where the issue rests ... for now.



[Cont. from p.16] dump grease. Every year, a million pounds of grease arrives by truck or is skimmed off sewage clarifiers and ladled into holding tanks called scum pits. The District pays \$500,000 annually to ship the stuff to Mexico, where it's refined into turpentine and chemicals for tire manufacturing.

To put EBI to the test, researchers added the bacteria to a scum pit for one week. But collecting reliable data turned out to be impossible. The microbes do their best aerobics when temperatures in the scum pits hit 90 degrees F., which never occurred during the test period. (The bacteria go dormant at 60 degrees.) Also, the bacteria thrive in a neutral environment (pH7), whereas the scum pits often gave pH readings of 5 or below.

Even so, Dawn Flancher, the District's operations specialist, was cautiously optimistic. "We couldn't quantify how much grease was reduced," she reports. "But you could look at it and tell the bacteria were working — the grease turns a real dark brown."

Despite the mixed reviews, Doug Scott is trying out EBI's system at his Havana Street Restaurant. Now a five-gallon plastic bucket filled with live bacteria sits under his steamer, an electric pump injects the bacteria into his drains, and a thriving bacterial community populates his grease trap and sewer pipes. So far, the microbes have consumed all of the used grease from the restaurant's kitchen.

"There are substantial environmental benefits, but I didn't do it for that reason," says Doug. The real reason? Less hassle. He hasn't had to call the grease collector since December, '91.

— Jeremiah Kaplan

A WRITER BASED IN BOULDER, JEREMIAH KAPLAN
HOLDS AN M.A. IN BIOLOGY AND PLANS
TO ATTEND MEDICAL SCHOOL.

This Just In...

Go Figure Four utility companies planning to build a wind-power farm in the Rattlesnake Hills near Richland, Washington, have run into NIMBY opposition from their prospective neighbors.

Opponents argue that the wind turbines will destroy their scenic "view shed," threaten birds, and interfere with TV and FM radio reception. Part of the proposed site sits within the federally owned Hanford nuclear reservation. Opponents of the wind farm hail from surrounding communities, which are decidedly pro-nuke. The largest employers in the area are companies that contract with Hanford.



.....

Ready for 70% Recycling? Bowing to public pressure, this past July the Rhode Island Legislature cancelled construction of the state's three planned trash-burning incinerators. Of course, garbage continues to mount, leaving Rhode Island's waste managers to scramble for a way to achieve an unprecedented 70-percent recycling mandate. (The politicians don't have a clue, but that didn't stop them from setting the Olympian standard.)

Is there a model elsewhere for what the state needs to do? "Nope," laughs Edward Connelly, acting executive director of Rhode Island Solid Waste Management Corp. "Whether we can take the existing technology and get 70 percent [recycling] out of it, we just don't know."

.....

Good Vibrations Quit fighting over whether handwashing or machine washing dishes uses more water. The debate is passé — both use more water than vibrating your dishes. Yes, the cutting edge in cleaning technology sends super-hot bubbles through water to kill germs and suck grime (literally) off dishes.

Designed for big, commercial kitchens, the technology could save 7.5 billion gallons of water, \$75.6 million in energy costs, and untold drums of caustic cleaners (nationally), according to the Department of Energy. (Fitting the technology to household appliances may not be economical.) Ultrasonic Products, of Channel Island Harbor, Calif., expects its units to be hitting the market later this year.

.....

Yellow Pages to Yellow Pans With markets for secondary wastepaper currently favoring old newspaper, the outlook for recycling the Yellow Pages has been pretty blue. But here's a silver lining, so to speak: A Toronto-based company called Vernacare has come up with a way to recycle phone books into egg-carton-like liners for hospital bed pans. The disposable liners save plastic bed pans, which typically get tossed when the patient leaves the hospital. More important, they're creating a needed market for recycling phone books: one four-pound book makes 50 liners.

Richard Vosylius of Vernacare says the company supplies some 350 hospitals in the U.S. But new hospitals, especially image-conscious ones, are slow to sign on. "It's ugly," he says of his product. "But think of what goes into it — does it really matter what it's made of?"



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Digging for Pay Dirt

BASED ON EXTRAPOLATIONS FROM DETAILED INSPECTIONS OF landfilled garbage, it seems likely that the citizens of Tucson, Ariz., discard daily some \$3,000 in coins. But before you quit your day job and head to a landfill with pick in hand, consider that mining the loot would require becoming intimate with 600 daily tons of garbage. That's a big chunk of trash.

In 20 years of digs, the Garbage Project has exhumed just 150 tons of buried waste.

As director of the Garbage Project, I've received many pleas for help from unfortunate souls who have lost to the bowels of landfills everything from diamond rings (often discarded with potato skins) to priceless family heirlooms (such as a diary kept by an ancestor during the Civil War). Those who arrive at a landfill to quest for their mistakenly discarded, freshly interred valuables are many. Those who return with their grail are few.

The losses cause suffering that's quite genuine, but so are the costs and logistics of a full-press landfill search.

Take an infamous South Carolina case: In February 1991 a local newspaper, *The Greenville News*, won a state Freedom of Information Act lawsuit against the University of South Carolina's Carolina Research and Development Foundation. The South Carolina Supreme Court ruled that the newspaper could review the foundation's financial records — records that would eventually help convict (in May '91) former University of South Carolina President James Holderman of state tax evasion.

Trouble was, many of those documents were dumped in a Richland County landfill in September '88. During the intervening 30 months, the landfill took in about 480,000 tons of trash. Some eight new landfill deposits, called cells, were

added to the burial place. A single cell measures 1,000 feet long, 150 feet wide, and about 20 feet deep. To make matters worse, Richland County Landfill is a co-disposal site, where municipal sewage sludge is

spread over the refuse, partly to speed the decomposition of organics such as paper.

That didn't stop Tim Smith and William Fox, two intrepid *Greenville News* reporters, from mining the landfill for the journalistic equivalent of a mother lode. As a veteran of 14 landfill digs, I knew the odds were excellent that the documents were well-preserved; but the odds of finding them seemed beyond hopeless. Luckily, no one asked my opinion.

Smith and Fox rapidly assimilated the basic tricks of the archaeological excavation of landfills. Donning gloves and



Mission improbable: *Greenville News* reporter William Fox, braving heady odors from the Richland County (S.C.) Landfill, hunts for treasured trash.

masks, they worked behind a backhoe, combing through mountains of refuse with shovels and rakes. With the landfill staff, they traced the progress of depositing garbage at Richland (to the river, work to the side, start back). They learned to date garbage by its relation to the "crust" of cleanup debris generated by September 1989's Hurricane Hugo; and by reading the dates on newspapers. They became adept at sidestepping medical wastes.

Like Garbage Project staff, the reporters were surprised to find newspapers and other paper artifacts in near-pristine condition. The discovery buoyed the searchers' hopes. For an entire week, a backhoe scooped refuse out of a trench. Wastes were examined, dated, and reburied. As the backhoe crawled methodically onward, the equivalent of a football field was excavated to depths of 6 to 18 feet.

Oh, how I wish I could have been at Richland Landfill in March '91, when the crew hit pay dirt. The cardboard containers had decayed, but the papers were still intact after 30 months of co-disposal burial — soggy and smelly, but readable.

As rewards for their diligence, the reporters and their editors won the AP Managing Editors' Public Service Award, the Investigative Reporters and Editors' Award, two awards from the Headliners Club, and the Seldon Ring Award which includes a hefty cash prize. But probably the most fitting reward was justice: In addition to the former university president's conviction, the entire board of directors and two top executives resigned from the Carolina R&D Foundation, and new state laws were enacted to ensure public access to foundations receiving public moneys.

Once again it's become clear that our trash has many valuable tales and treasures to disclose. I hope to keep this truth so fresh that I won't have to be reintroduced to it by lionhearted garbology novices like Smith and Fox.

Archaeologist Dr. William L. Rathje is founder and director of the Garbage Project, and professor of anthropology at University of Arizona-Tucson.



Terry Ashe

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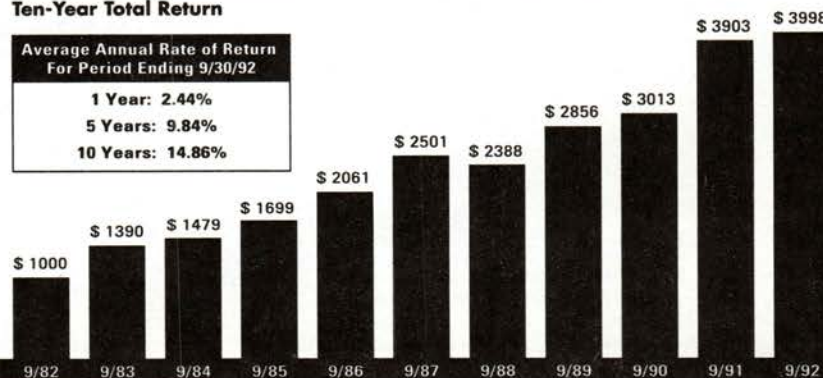
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GLOBAL WARMING

By Charles T. Rubin and
Marc K. Landy



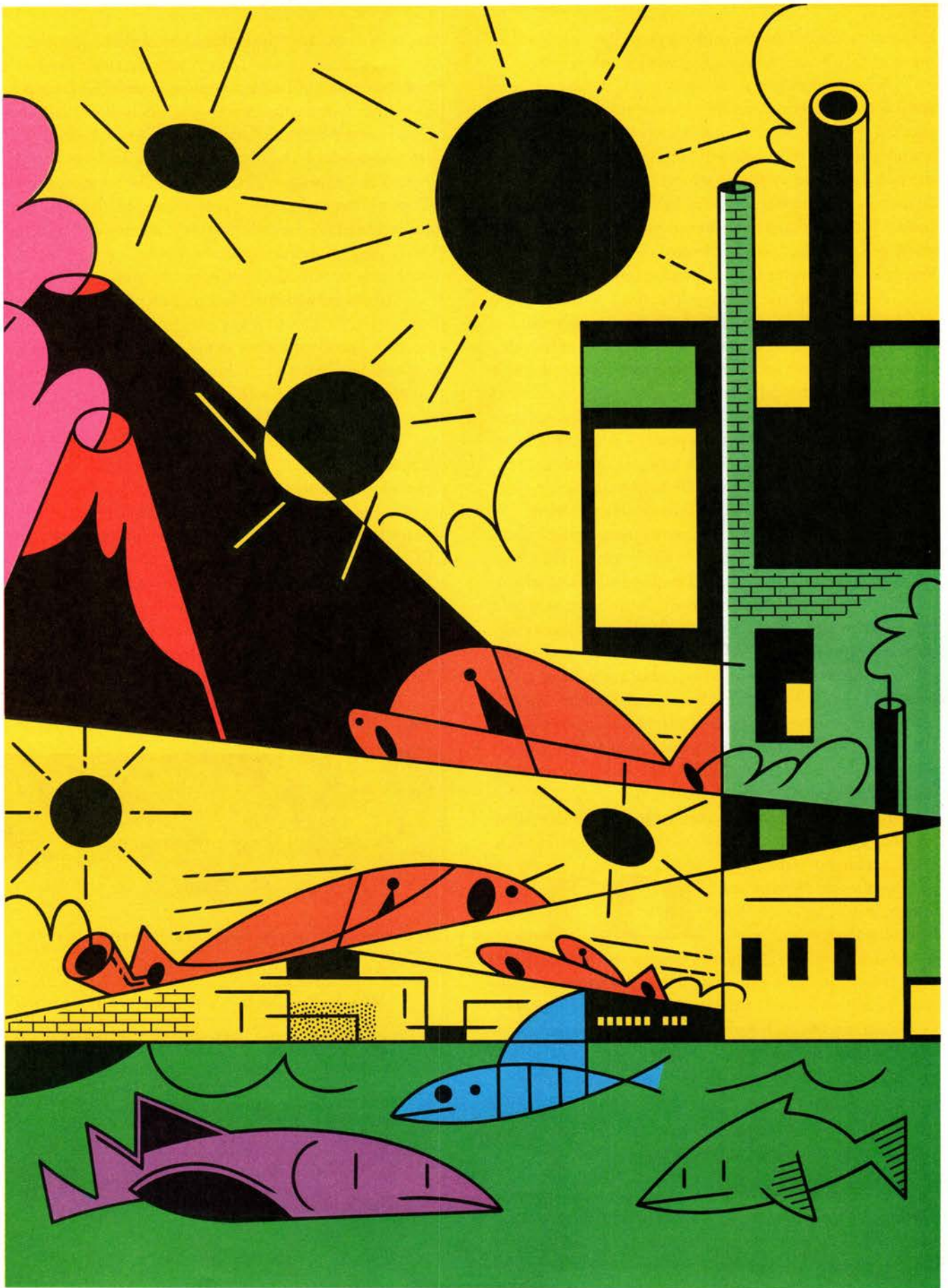
ILLUSTRATION BY J. D. KING

CHARLES T. RUBIN (Duquesne Univ.) and MARC K. LANDY (Boston College) are professors of political science. This article was adapted by the authors from a longer, unpublished monograph entitled "Stormy Weather: Science, Politics, and the Greenhouse Effect."

TO THE SCIENTIFICALLY TRAINED OR MERELY OBSERVANT reader, a giant gap exists between popular accounts of global warming and the scientific reports upon which they are purportedly based. These discrepancies are very disturbing, because the popular treatments influence policy makers, opinion leaders, and of course the public at large.

For example, like a number of other environmental organizations, the World Resources Institute published a mass-market treatment of the issue. Entitled *The Greenhouse Trap*, the book makes frequent reference to two massive studies on global warming by the Environmental Protection Agency. It summarizes one finding by saying that "among the predictions" made by the EPA are "greatly decreased forest yields, crop losses, and 'moving' grain belts." Stories in *Newsweek* and *Popular Science* likewise present the EPA's results as predictions, while the *Washington Post* outlined the agency's "dire forecasts." However, the reports cited made no predictions at all. They did something quite different: They discussed "scenarios." Later on we'll see why treating scenarios as if they were predictions is so misleading.

Another discrepancy comes in the use of the word "consensus." The National Academy of Sciences has studied climate change since long before the blistering summer of 1988, when Congressional hearings brought the terrible possibilities of global warming to broad public attention. Studies produced under NAS' auspices are often cited in support of the existence of a "scientific consensus" about the sources and impacts of human-induced global warming. These studies do not define a scientific consensus on global warming; in fact, the authors themselves



frequently admit that they are unable to do so. If a consensus does not exist, then it cannot serve as the basis for making policy.

Nevertheless, given the election of Clinton and Gore, along with international commitments made by the Bush administration at the Rio Summit, making policies to address global warming is going to be a growth industry. That this environmental issue should so quickly achieve such a prominent place on the nation's agenda is surprising to professional students of politics, because it flouts conventional wisdom about American public policymaking. In our fractionated and chaotic political system, policy change is *expected* to happen slowly.

Political experience usually teaches that a problem will rise on the public agenda only if it meets the triple criteria of *serious*, *certain*, and *soon*. The global-warming problem fails two and possibly all three of these tests. It is not likely to occur soon. (Even its strongest advocates agree that its palpable effects will not be felt for decades.) There is nothing certain about the scope of the problem; great uncertainty exists about whether it will happen at all. Although dire consequences could follow from a drastic increase in global mean temperature, scientists' inability to assess the likelihood of such an event makes it hard to determine how seriously to take the problem.

Yet global warming has become a pressing public issue, the subject of newspaper headlines, television scrutiny, congressional hearings, and myriad national and international conferences. This departure is of more than academic interest. Could it signal a new maturity in the relationship between science and politics in American public life? After all, "certain" and "soon" are hardly sufficient criteria for sound public action. Uncertainty lies at the heart of all modern environmental problems. Nor is it always wise to wait to act until the full brunt of a problem is felt. If the global-warming story reveals that the public can be given early warnings of trouble and thereby galvanize governmental action, then scientists and citizens have cause to rejoice.

But it's just as plausible that the heightened attention reveals less idealistic attributes of modern American politics. Perhaps a kind of public hysteria has pressed government into premature action. If that hysteria is the result of "apocalypse abuse," where did the abuse originate? It could have come from those with something practical to gain from it. It could have been fanned by those with a deeply felt animosity for industrial society. Or perhaps the intellectual assumptions which underlie the interpretation of the evidence are flawed. All three factors could be at work.

The Notion of **CONSENSUS**

ALL HONEST ACCOUNTS OF GREENHOUSE-EFFECT WARMING ACKNOWLEDGE uncertainties in predicting future climate conditions. Since in this area one cannot speak of unambiguous scientific truth, those who want action must refer to some other standard to bolster their case. The assertion is often therefore made that a "scientific

consensus" exists about this or that aspect of global warming.

"Scientific consensus" is not in itself, of course, a measure of unambiguous truth. What does the term really mean? Unfortunately, it has come to be used as the science writer's equivalent of the anonymous source, as in the much abused phrase "scientists believe that...". Does consensus imply that all scientists agree, or do all scientists with the relevant expertise agree? Does it mean that the best scientists in the field agree? Does it refer to the results of some poll? (If that last were the relevant meaning, "greenhouse policy" efforts would be in trouble. Polls suggest that most scientists think global warming is not well enough understood to allow good policies to be made to address it.)

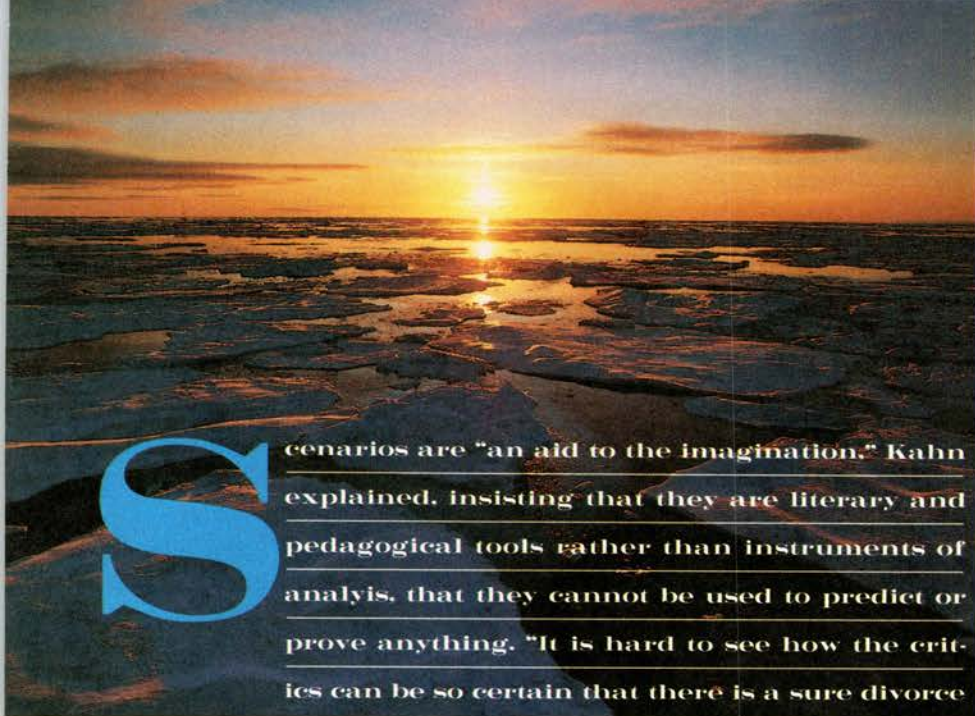
In the global warming debate, the existence of a consensus is often supported simply by reference to reports put out by various scientific organizations or study groups, such as those sponsored by the NAS. A closer look at what these reports really have said over the years is quite revealing about how useful the supposed "scientific consensus" is going to be for making policy.

Take, as one familiar example, the point that summarizes the extent of global warming expected: the mean global surface temperature increase *in the event* of a doubling of atmospheric CO₂ or its equivalent. (There is no consensus on what the relationship is between increased CO₂ emissions and the amount of atmospheric CO₂.) Various NAS reports agree that we may expect an increase of from 1.5 to 4.5 degrees centigrade. Consensus! But what does that tell us? At the bottom of this range the impact produced by warming would be minimal; at the top, potentially catastrophic. A consensus over such a wide range is not a solid basis for deciding what needs to be done, if anything.

Furthermore, one report calls this range "most probable." Another calls the range "very probable." Yet another says that "val-

m

uch of what passes for consensus represents an effort to devise language sufficiently ambiguous to allow scientists who actually harbor significant differences of opinion to sign a joint statement without violating their professional scruples. The policy entrepreneurs are then free to cast these documents to a wider public with whatever partisan gloss they see fit.



Scenarios are "an aid to the imagination," Kahn explained, insisting that they are literary and pedagogical tools rather than instruments of analysis, that they cannot be used to predict or prove anything. "It is hard to see how the critics can be so certain that there is a sure divorce from a reality which does not yet exist."

ues in the lower half of this range" would be "more probable" than values in the upper half. What do these vague estimates mean? One report states that it understands its predecessor "to imply a 50 percent probability that the true value would lie within the stated range." In other words, the truth is as likely to be outside as inside the range. Despite the careful wording to imply consensus, it doesn't take a linguist to see that the true meaning is "we don't know."

What would be the significance for a particular location or ecosystem of an increase in average surface temperature in this range? Here the reports *are* in agreement, but now the consensus is explicitly about what is not known. Nobody knows the specific regional effects produced by global temperature change.

If the change in global average surface temperature is so unilluminating, why is it the stock-in-trade of both consensus formulations, and popular concern? One report notes that the figure is used, despite its problems, because it is the only product of many computer climate models "with much scientific validity." Never mind that it is not a terribly useful result; it is the only one we have. Furthermore, states a report, it "may suggest well the nature of our unease..." In other words, the numbers have emotional significance.

When committees have to come to decisions and make reports, there is always a strong incentive to find statements broad enough or ambiguous enough to paper over potentially important disagreements about particulars. That's all very well for the scientists, who know what they disagree about, but it leaves the public in the dark. Yet the god of policymaking is in just such details.

The Misapplication of **SCENARIOS**

UNLIKE THE MEDIA AND THE GENERAL public, sophisticated report readers are likely to understand the limitations of scientific consensus. Greenhouse policy advocates have an answer, of sorts. Looking to build on the very generalized consensus

reports in a way that makes uncertainties appear more concrete, in order that they can make policy recommendations, they have waded deep into the development of scenarios.

There has been increasing interest in creating models that simulate the effect of climate changes on particular ecosystems or human economic activities, and vice versa. To investigate policy options, such models are used to compare what is likely to happen to natural and manmade systems under various assumptions about the extent of warming, and with various methods of reducing greenhouse emissions. Two massive EPA reports have attempted to estimate the effects of global climate change on the United States, and also to look at how effective different policy options might be at reducing greenhouse emissions.

The most striking feature about such efforts is that they are not, in the expected scientific pattern, attempts to make predictions about the future. They are instead examples of "scenarios." At their simplest, scenarios are nothing more than attempts to work out in a thoughtful way the possible consequences of a certain set of assumptions. As a "method" employed by the social sciences, scenarios owe much to the work of Herman Kahn during the 1960s. Kahn employed scenarios most notoriously in his work on nuclear war. In books like *Thinking About the Unthinkable*, Kahn studied possible aspects of nuclear conflict through attempts "to describe in more or less detail some hypothetical sequence of events." His vivid "future histories" of nuclear disaster are precisely what led to his Dr. Strangelove reputation.

Kahn always stressed that the scenario is "an aid to the imagination." He insisted that they cannot predict or prove anything. Since Kahn's scenarios were like short stories, it was always easy to remember their origins in the imagination and the limitations those origins imposed.

The EPA reports repeatedly stress that their scenarios cannot be taken as predictions. But the extensive employment of computer modeling and quantitative analysis in the EPA scenarios makes them a far cry from the literary devices Kahn employed. Every attempt is made to make them appear to be tools of rigorous analysis. The apparent precision of the results has made the temptation to use them to draw policy conclusions hard to resist, despite the EPA's disavowal of the intention of doing so.

For example, the Executive Summary of the EPA policy options report notes that the policy scenarios are "meant to stimulate further study" and are not "conclusions about what would be the most feasible and cost-effective strategies" for dealing with global warming. Fair enough. Yet the report also concludes that a strategy of stabilizing greenhouse gas concentrations "is a costly, perhaps impossible, goal given current economic expect-

tations and expected technological developments." That certainly *sounds* like a conclusion about a strategy.

With the emphasis on producing rigorous, quantifiable results, it is easy to forget that we are still dealing with stories that are essentially the products of imagination. A striking example of the result of such imaginative thinking is to be found in the EPA report that examined the potential effects of global climate change on the United States. (Note that this entire effort is an attempt to do what the NAS reports said was as yet impossible to do, i.e., determine regional effects.) Its Executive Summary explains why the scenarios presented cannot be considered predictions. But read carefully and you will see that the summary also reveals that the scenarios are based on what might charitably be called an unrealistic assumption: that in the face of any climate alteration, human beings will not be making constant, incremental adjustments to changes as they occur. When the study concludes that the "findings suggest a world different from the world that exists today" we can well believe it, because in the fifty years which the report covers, the world would look very different even *without* climate change if we were not constantly making "responses and adaptations" to natural forces.

If those writing the scenarios become somewhat confused about what they have done, when the results fall into the hands of EPA spokesmen, the situation gets worse. Spokeswoman Linda Fisher is said to have made the following comment about the draft policy options report: "We look at the report as good news, because it says there are things we can do" about global warming. Is she not expressing confidence that the measures outlined in the report will work as the scenarios suggest, thus turning them into predictions of what will happen if we implement certain policies? A few months later, then-EPA Administrator William Reilly put a different spin, also a predictive

one, on these conclusions. He said that "under our most optimistic control scenario, we could reduce global warming in the year 2025

by only one-fourth" of the expected increase. The statement treats a scenario as if it were a control plan, and predicts the effects of putting that plan into action. Is it any wonder, then, that news media treat these reports as predictions?

Buying Insurance: A suspect **ANALOGY**

IF ATTEMPTS TO JUSTIFY GREENHOUSE POLICY ON THE BASIS OF scientific consensus and/or the use of analytical scenarios are flawed, there remains one last bow in the quiver of greenhouse policymakers. Accepting the vast uncertainties that remain in the scientific realm, they turn (not necessarily inappropriately) to a purely political argument: that we should look at greenhouse policies as a form of insurance. Prudence dictates that if the risk is great enough, doubts about its likelihood should not prevent one from cushioning the risk. Hence the claim that choosing to act on global warming is no different from buying a life-insurance policy.

The analogy is deeply flawed. Although people who buy life insurance do not know their individual chances of dying at a given age, the actuarial tables enable them to estimate that probability based on a set of demographic categories — age, sex, race, etc. Their purchase of life insurance therefore has three components: 1) an assessment of the likelihood of premature death based on an evaluation of the pertinent actuarial categories; 2) an assessment of the magnitude of the financial loss to the family should the purchaser die prematurely; and 3) a calculation of the opportunities foregone by choosing to protect against that loss.

At this point, a similar set of calculations is impossible for global warming. Even if, in principle, one would want some insurance against such a potentially catastrophic possibility, no reliable guidelines exist for how much to buy. Consensus estimates have at best narrowed the range of concern, but there is still no consensus regarding the wide latitude of possible outcomes to be protected against.

Neither does the analogy hold up for the second and third calculations above. For example: Why not simply assume the worst? To do so would obviously vastly increase the cost of protection. Spending money now to send a child to college may be better than trying to insure the child an inheritance. There are times when the cost of the heirs' adjustment to the loss of a family member is smaller than the cost of insurance. Even if warming eventually occurs, the cost of adaptation in that event might be lower than that of effective prevention.

Two additional arguments usually accompany the insurance-buying model. One claims that the actions advocated have merit regardless of whether warming occurs and therefore should be done anyway. This argument is incoherent, and displays the opportunism that is the hallmark of much

To get their piece of the pie, greenhouse policy entrepreneurs must continually fan the flames of public hysteria.

Apocalypse abuse thus leads to a public that is cynical about what it is told, without being genuinely skeptical.



he consensus is explicitly about what is not known: Nobody knows the specific regional effects that would be produced by global climate change. If we know little about the impact in any given area, we have little basis upon which to formulate policies that could hope to respond to such a change before it happened.

discussion about global warming. If such steps are defensible on other grounds, let arguments so constructed be made and evaluated.

The other argument involves the debt one owes to future generations. Serious concern about the future of children, grandchildren, and the species is a legitimate part of policymaking. If it is to be taken seriously, however, a full accounting is required. The tendency these days is to view that legacy in strictly environmental terms, as if the only thing of worth we leave behind is that which we are least responsible for creating. Consider the cultural, economic, technological, and intellectual legacies. Capital comes in many forms. A proper concern for the wellbeing of future generations could conceivably lead to more energy use in this generation, not less, if that would enhance the lives and prospects of people in poor as well as rich nations.

The insurance analogy, once understood, offers little corroboration to advocates of aggressive action. Given the lack of the real knowledge of the problem's dimensions, a sensible global-warming insurance policy would probably be limited to continued research into the nature and likelihood of what remains a very poorly understood phenomenon. To quote NAS' "Changing Climate" report:

It is probably wiser not to act aggressively to "solve the CO₂ problem" right now when we really do not know the future consequences or context of CO₂ increases. In trying to consider the world of 50 or 100 years from now, we cannot be sure that we can tell the difference between solutions and problems.

What's the Real **QUESTION?**

WHAT SHOULD WE BE ASKING OF SCIENTISTS AND RESEARCHERS? We suggest that the manufacturing of consensus is not likely to be helpful to policymakers. Much of what passes for consensus represents the effort of policy entrepreneurs, both public and private, to devise language sufficiently ambiguous to allow scientists who actually harbor significant differences of opinion to sign a joint statement without violating their professional scruples. The policy entrepreneurs are then left free

to cast these documents to a wider public with whatever partisan gloss they see fit.

As long as middle- and senior-level environmental administrators believe that they are expected to "create policy," that is what they will do. Recent graduates of public administration programs are likely to enter government service under the impression that part of their job is to know their "line" of policy and make sure that they can "sell" it. They will seek out science and scientists whose findings justify the policy initiatives they favor.

To get their piece of the pie, greenhouse policy entrepreneurs must continually fan the flames of public hysteria. And of course as the problems grow in seriousness, so must the proposed solutions be inflated.

As the public is whip-sawed between the results of contradictory studies, a growing cynicism about science develops that might more appropriately be targeted against scientists who present incomplete or speculative findings to the public before they present them to their peers. More skeptical citizens and legislators would be less willing to plan for the remaking of civilization every time a new risk appears on the newswires.

Perhaps the single most useful reform would be to expand the availability of private sources of scientific research funding. The growing federal role in funding and directing scientific research, to which a decline in private-sector funding seems to correspond, is a relatively new phenomenon. It may even have something to do with the growth of the environmental movement in this country, since one of Rachel Carson's main targets in her landmark *Silent Spring* was the corporate funding of scientific research.

Apocalypse abuse creates great expectations and continual disappointments; it thus leads to a public that is cynical about what it is told, without being genuinely skeptical, alienated by the messengers rather than maintaining a prudent caution about the message. In such an atmosphere, the chances of adopting greenhouse policies favorable to the long-term economic and political viability of the nation are slim indeed.

For further reading: The EPA studies cited: "The Potential Effects of Global Climate Change on the United States" (1989), and "Policy Options for Stabilizing Global Climate" (1990). The NAS studies cited: "Carbon Dioxide and Climate: A Scientific Assessment" (1979), and "Changing Climate" (1983). See also: "Current Issues in Atmospheric Change" (1987), National Research Council.

REAL WORLD

SEPTICS B

AS AGING SEPTIC SYSTEMS FAIL,
ENVIRONMENTALISTS HERALD "NATURAL" ALTERNATIVES
TO COSTLY, CONVENTIONAL SEWAGE TREATMENT.
HERE WE INTRODUCE FOUR TOWNS THAT HAVE DISCOVERED
ANOTHER REASON FOR BACKING ALTERNATIVES:
THEY'RE AFFORDABLE.



PHOTOGRAPH BY TSAR FEDORSKY

Y THE SEA

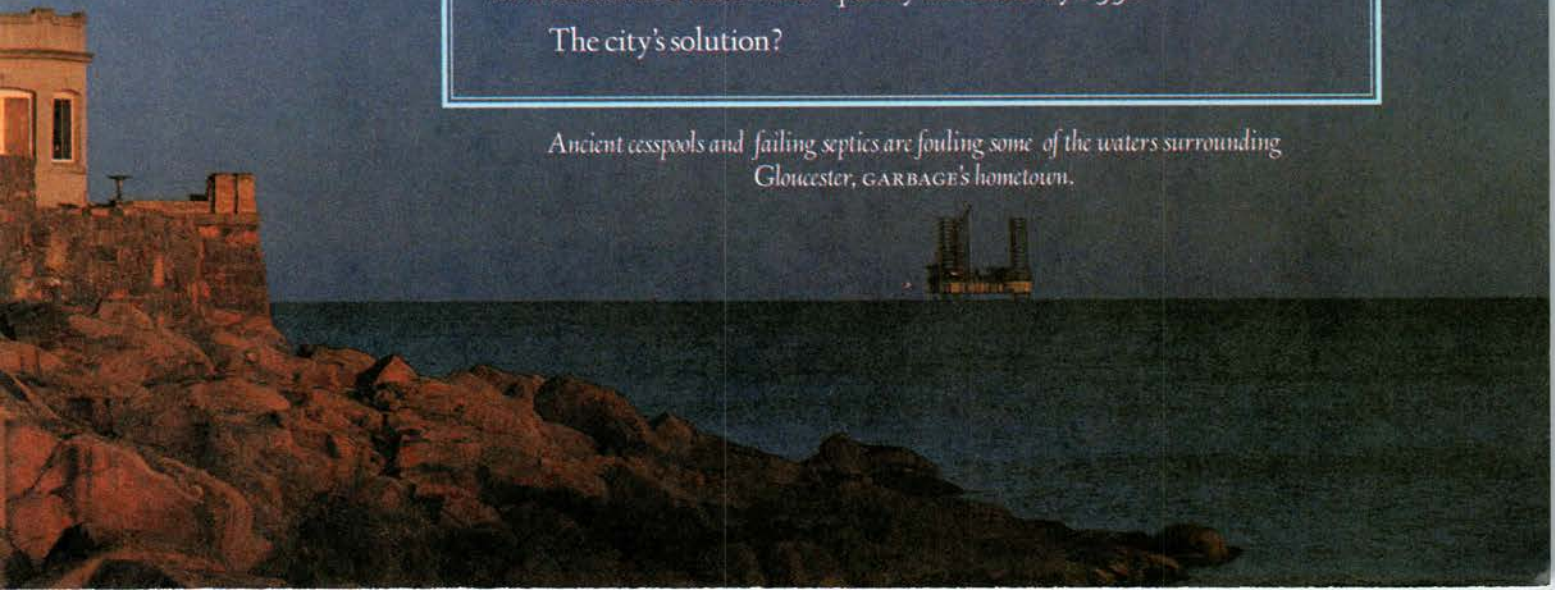
In the northern end of GARBAGE's seaside hometown of Gloucester, Mass., the septic tanks aren't working. Gloucester's great slabs of granite and its near ground level water table make it close to impossible for septic tanks to do their job. Each patch of ground that absorbs effluent from a septic tank must have soil cover that runs at least four feet deep. At many north Gloucester homes, the soil is stretched like skin over bone.

Gloucester does have a sewage-treatment plant, but north Gloucester is beyond the reach of its pipes. Each day, septic septage seeps over rock and trickles down to the sea. Fecal coliform levels in some coves along the shore have measured as high as 2,400 coliform colonies per 100 milliliters of water. To be acceptable for harvesting, shellfish beds can show no more than 14 colonies per 100 mL. Needless to say, the clam flats in north Gloucester have been closed, most since the late 1970s.

After years of filing complaints and watching them go unheeded, the state Department of Environmental Protection and the federal EPA took Gloucester to court in 1989 for violations of the Clean Water Act. Under a consent decree, north Gloucester must come into compliance with federal and state water-quality standards by 1998.

The city's solution?

Ancient cesspools and failing septic tanks are fouling some of the waters surrounding Gloucester, GARBAGE's hometown.



If you tried to drive up to the north Gloucester villages of Bay View, Annisquam, or Lanesville any time over the last two years you ran right into it. Giant excavators blocked the streets, leaving bewildered drivers to negotiate a maze of detours. Work crews from four different contracting companies jackhammered asphalt and blasted as deep as 16 feet into granite ledge. They laid miles of 10- and 12-inch sewer pipes and built 11 pump stations at low points along the route.

The city's much-disputed solution, in other words, was to extend the pipes from its central sewer plant to all the homes in north Gloucester. So far, they've finished the first of four construction phases. Call it hard sewerage.

As recently as 1987, federal and state funding could have covered 90 percent of the approximately \$45-to-\$50 million price tag for the entire job. That funding disappeared with the '80s. Now, if the entire sewer extension were completed, property owners would face a

ment, these streamlined yet sophisticated on-site technologies could offer communities like Gloucester a solution to their water-pollution problems.

Data from towns that use alternative systems show that they can easily treat sewage well enough to comply with the Clean Water Act. What's more, an alternative system combining sand filters and septic-tank effluent pumps could cut Gloucester's sewer bill by one-third.

Those two news flashes won central-sewer opponents scores of new allies. They launched a crusade to persuade skeptical town managers that an alternative system would tally a lower cost than conventional sewerage. They also had to demonstrate to an even more incredulous state bureaucracy that alternative technologies are effective. The state grudgingly agreed to a compromise, permitting a two-year demonstration of sand-filter systems in north Gloucester.

Variations on Gloucester's septic scenario are being played out across the

the environmental protection that's required by law. Each day, Gloucester's sewage plant pipes 3.3 million gallons of primary treated effluent 2.5 miles into open ocean. Tests by an EPA-contracted consultant show that marine life in the 90-foot waters remain unaffected by the diluted organic matter, chlorine, fresh water, and heavy metals (in very small amounts) in the town's effluent.

Central sewerage has the added advantage of easy monitoring. If the sludge collector in the clarifying tank breaks down or the bearings in a pump station go bad, the problem is detected at the plant, where technicians can fix it quickly — without involving homeowners.

With on-site systems, what sort of management entity will oversee inspectors? And who is responsible for fixing a failing system, the city or the homeowner? Managing on-site systems means more involvement with local residents, who can get pretty cranky when regulators come knocking.

"People don't like to be told what to do and it becomes an adversarial relationship," says Lynn Brown, environmental engineer for the Gloucester Department of Public Works. "I'd rather not have to deal with it."

Environmentalists embrace on-site treatment systems because they deliver an exceptionally clean effluent, use less energy than treatment plants, and largely eliminate chemicals. But economic factors are really pushing towns to consider alternatives. And cost-competitive alternative technologies are catching on: Municipalities nationwide with some kind of alternative wastewater-treatment system number in the thousands.

In the world of wastewater management, few professionals advocate alternatives for alternatives' sake. But alternatives can provide an effective solution to failing septic systems and resulting water pollution. What follows is an up-close look at how communities in California, Alaska, and Wisconsin are opting for three different, yet innovative treatment systems.

— Ethan Seidman

ETHAN SEIDMAN IS ON STAFF AT GARBAGE.

In Illinois alone, more than 400 communities are plagued by failing septic systems.

hefty "betterment fee" to cover the \$25.7 million tab for the remaining work. Driving through the locally dubbed "war zone" of dumpers and dozers served as a daily reminder of the impending financial burden each property owner might shoulder. That kind of money and hassle can motivate citizens to act.

ON AN EVENING IN LATE MAY, ABOUT 200 north Gloucester residents pack the seats of the junior-high auditorium where Stephen Dix, technical director of EPA's National Small Flows Clearinghouse, is giving a slide show. Small Flows is the national information center for alternative sewage technologies. Eschewing the chemicals and complex mechanical devices used in conventional sewage treat-

country. As aging and poorly sited systems fail to meet tough new environmental regulations, towns throughout the country are forced to look for better ways to treat their sewage. In Illinois alone, the state health department has identified over 400 communities with failing septic systems.

In the past, there was an abundance of federal funding for replacing aging septic systems with large, conventional treatment plants. But in 1987, Congress passed amendments to the Clean Water Act that shifted responsibility for financing more than \$83.5 billion dollars in improvements from the feds to the states. According to the General Accounting Office, one-half of the nation's states can't provide enough assistance to meet the wastewater-treatment needs of their smaller communities.

WHILE ALTERNATIVE SYSTEMS OFFER A HOST of ecological pluses, conventional sewerage in Gloucester does deliver

Thanks to Stephen Dix, technical director of the EPA's National Small Flows Clearinghouse, for reviewing these articles.

Sand Filters: The Aseptic Septic System

Stinson Beach, California

THE OCEANFRONT HAMLET OF STINSON Beach, Calif., is a 40-minute drive north of San Francisco. Here, homes are perched on steep slopes nearly 800 feet above the Pacific. More homes crowd a series of lagoons. Along with a complex range of soils and groundwater that in some areas rises to just a few feet below the surface, local conditions make healthy disposal of household wastewater a real challenge.

On a sandy spit surrounded by lagoons stands a Stinson Beach neighborhood called Seadrift. The front yards of about 100 homes here feature a pair of raised flower beds, built on railroad ties. It's unlikely that a casual visitor could tell that the stylized landscaping camouflages an innovative wastewater-treatment system tagged "intermittent sand filters." But Stinson Beach and dozens of other communities are finding that sand filters, an updated version of a century-old technology, are proving to be an ecologically acceptable sewage-

treatment method for homes built on marginally acceptable sites.

LIKE MUCH OF RURAL AND NEWLY SUBURBAN America, homes in Stinson Beach are equipped with some type of on-site disposal system comprised of a septic tank; a pipe-and-gravel-filled trench called a leachfield; and a large volume of soil for a final "scrubbing" of effluent. Starting in the early 1960s, a series of monitoring studies in Stinson Beach periodically found excessive coliform counts (indicating mammalian fecal matter) in groundwater and Easkoot Creek, which meanders through the center of town. Traced to its sources, the pollution showed that some septic systems were failing.

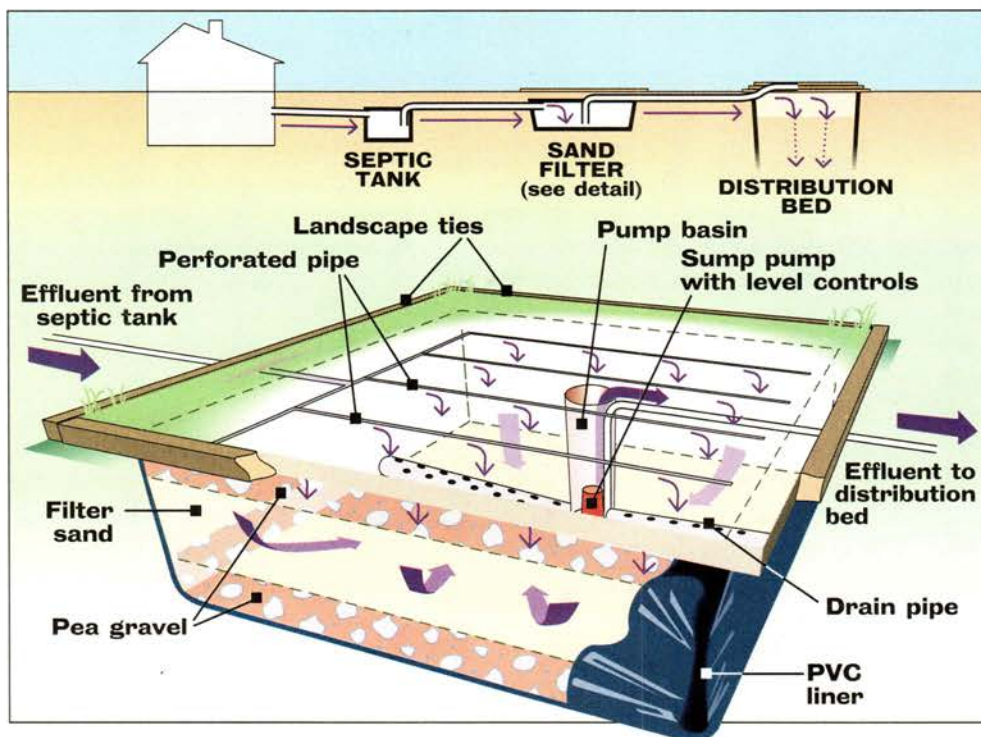
Sometimes, the symptoms are barely noticeable when a system goes bad. As septic-tank effluent moves through the soil, bacteria attack the pathogens. But if the effluent moves too rapidly, or if groundwater is too close to the leachfield's

bottom, then inadequately treated septage may percolate into groundwater. To determine if a leachfield is failing, inspectors test groundwater for *E. coli* bacteria and fecal coliforms, as well as various nutrients such as ammonia, nitrites, and nitrates.

Over a period of 12 years, Stinson Beach fixed all of its failed systems. But in 1987, a building moratorium ordered by regional water-quality regulators stopped all development in the Seadrift neighborhood. Regulators were concerned about the cumulative impact of a potential, full build-out on the sand spit.

To comply with the moratorium, Stinson Beach hired Dr. George Tchobanoglous, professor of civil engineering at the University of California at Davis, to analyze a number of alternative systems. After much study the town settled on Dr. Tchobanoglous' recommendation: intermittent sand filters designed and marketed by Orenco Systems Inc., of Roseburg, Ore. After a concerted lobbying effort, Stinson Beach won special approval from water-quality regulators to install sand filters in Seadrift.

NOT ALL SAND FILTERS ARE ALIKE. INTERMITTENT sand filters use pressure pumps to distribute a septic tank's effluent in short bursts ("doses") to a series of sand-



Filtering the Flush

With sand filters, the flush flows by gravity to an underground septic tank. A filter pump draws off the clearest effluent from the tank's middle section; solids are stored in the tank's bottom; automatic float switches prevent scum from clogging the filter.

The septic-tank pump doses the sand filter from four to six times daily. Effluent collects at the bottom of the filter and is pumped through a network of pipes in the raised distribution bed. Each dose is alternately directed to one-half of the distribution bed. While the other half "rests," its sand dries and microbes digest organic matter. Finally, treated wastewater percolates through the bottom of the bed and into the native soil.

filled beds ("distribution beds"). Each dose is followed by a period of rest — hence the "intermittent" prefix — which allows the filter to remain aerobic. (See illustration, p. 33.) As for the "sand" tag, it turns out that beneficial aerobic bacteria, which consume organic matter and some surplus nutrients, thrive among sand particles.

Intermittent sand filters do to wastewater what many traditional systems can't. They produce an effluent that approximates advanced, secondary wastewater from a conventional treatment plant; they withstand winter temperatures as low as -20°F . (communities in Quebec, Wisconsin, and Michigan use sand filters); and they take up far less yard space than a traditional septic system. Experience shows that they're very reliable and easy to maintain.

Of course, every technology has its limits, sand filters included. Foremost is their cost, which runs from \$5,000 to as high as \$26,000, depending on the area's hydrology and geology, the volume of wastewater, and other factors. Oregon's average is about \$7,000 to \$8,000. Seadrift's soils require customized sand filters that range in price from \$18,000 to \$26,000. At the lower end of their price range, sand filters cost about the same as a traditional septic system.

ON-SITE RESIDENTIAL SYSTEMS SUCH AS sand filters must also be monitored to ensure that they're functioning properly. Which begs the question: Are sand filters performing well at Stinson Beach? The short answer: The Stinson Beach County Water District, which is responsible for monitoring, hasn't done all of its homework.

State environmental regulators only recently received an evaluation of groundwater-quality compliance from Stinson Beach, two years after the reporting deadline. According to San Francisco Bay Regional Water Quality Con-

trol Board staffer Leslie Ferguson, "The report is inadequate and shows groundwater monitoring was, depending upon the test well, either done improperly or not at all."



Stinson Beach, Ca.:
The flower beds camouflage
an innovative septic system
called sand filters.

A lack of groundwater data doesn't mean that the systems are malfunctioning. Indeed, water-department inspectors regularly check the tanks and pumps and give the leach-fields a hydraulic-stress test. Stephen Dix of EPA's National Small Flows Clearinghouse, who has reviewed the inspection reports, says that the systems are performing well. Nevertheless, water pollution was one of the major reasons for installing sand filters,

and Stinson Beach regulators apparently have failed to determine whether sand filters are protecting the area's waterways.

It's ironic, because industry journals widely tout Stinson Beach's sand

filters as a premier example of this innovative system. But when it comes to groundwater monitoring, the claims are built on subjective assumptions.

Even so, sand-filter systems show a proven track record elsewhere. They've been tested for seven years by the state of Oregon and approved by its Department of Environmental Quality. And Small Flows reports that "under normal conditions, intermittent sand filters will produce high quality effluent, consistently better than that produced by [conventional treatment plants]."

Sand filters are increasingly used throughout the country to remedy failing septic systems and wastewater pollution. But technology is merely half the problem. The saga of Stinson Beach shows that this "alternative" won't join the mainstream until local governments devise effective management strategies for monitoring on-site systems.

— Robert Kourik

CONTRIBUTING EDITOR ROBERT KOURIK IS A VETERAN FIELD TESTER OF NUMEROUS SEPTIC SYSTEMS.

Return of the Composting Privy

Healy, Alaska

THROUGHOUT MOST OF ALASKA, SEWAGE treatment is pretty primitive. Permafrost, poor soils, and winter temperatures that regularly dip to -40°F . are just some of the factors making any type of advanced treatment system a challenging and costly endeavor. Small wonder that a 1991 study by the Alaska Department of Community and Regional Affairs estimates that 90 percent of the state's rural villages have substandard sanitation systems.

In the bush, the mode of choice is the "honey bucket," a five-gallon pail lined with a plastic bag and capped

with a toilet seat. When the bag is filled with human waste, it's carried through town and dumped in an open sewage lagoon. Short of going *au naturel*, the only practical alternative is the composting toilet — a process that converts human waste into humus.

Though environmentally correct, early composting toilets were plagued by insects and vile odors, reflecting the aesthetics of an outhouse. In northern climes, the devices were also likely to freeze. So leave it to an Alaskan inventor and long time composter



Farewell to dry toilets:
New age composting
privies flush with foam.

named Clint Elston to spend the dark arctic winters troubleshooting a better composting privy. He calls it the AlasCan, as in "We Can."

Unlike other composting toilets, the AlasCan system treats *all* of your home's organic wastes and wastewater.

Bath tub, kitchen sink, and washing appliances drain into a greywater-treatment system. A large composting tank collects toilet and kitchen wastes (processed through a separate sink connected to an in-line garbage-disposal unit). The wastewater-treatment system negates the need for a septic leachfield, since aerobic decomposition occurs in the unit's reaction chamber.

Taken together, the AlasCan system is ecologically benign because the finished material — humus and a small amount of treated effluent that meets the EPA's secondary discharge standards — can be safely returned to the earth.

ABBY ROCKEFELLER, DAUGHTER OF DAVID Rockefeller, was the first to introduce composting toilets in the U.S. In the early '70s, Ms. Rockefeller imported a Swedish system called Clivus Multrum and formed a company bearing the same name in Lawrence, Mass., to market the devices. Back-to-the-landers were enamored with the privy's promise of conserving water and recycling human wastes. Clivus, along with a handful of other pioneering companies, enjoyed a brief boom in sales.

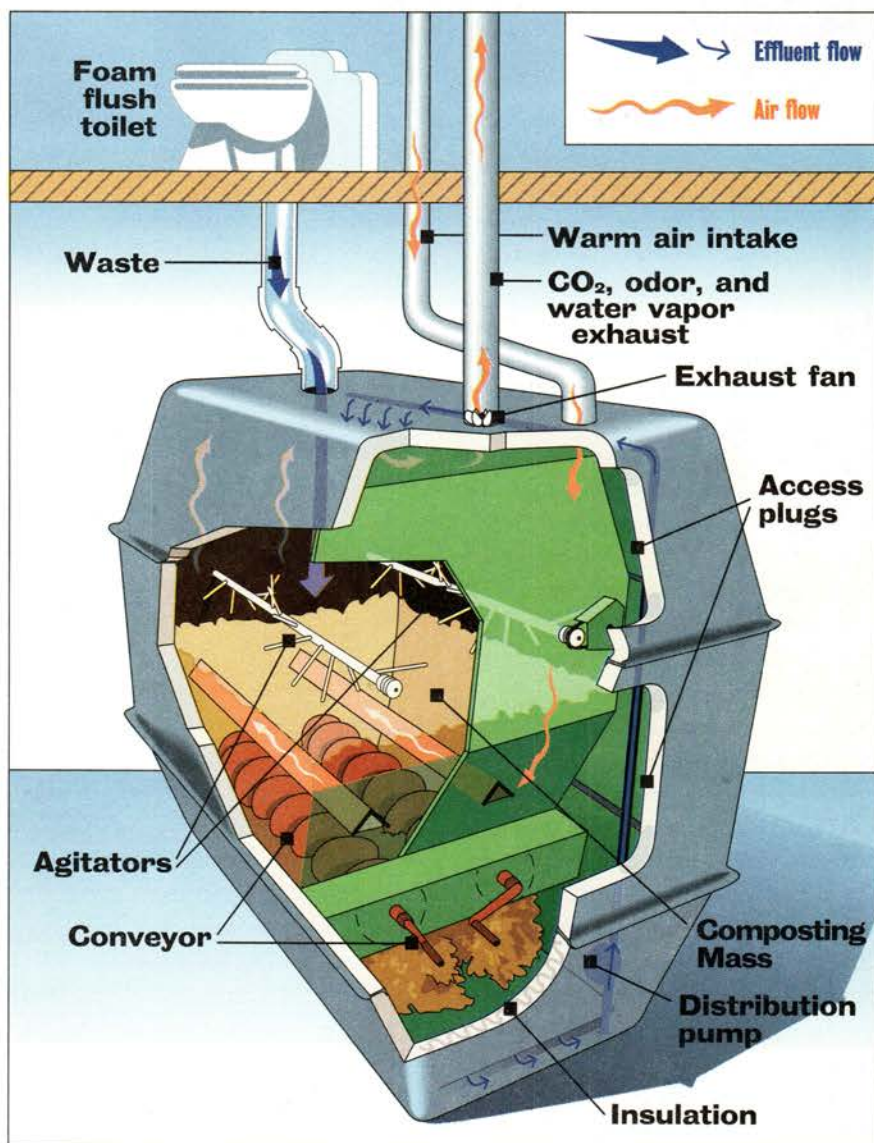
But public-health officials, relying on regulations that were heavily skewed toward conventional technology, were generally unenthused with the unfamiliar devices. Sales sagged during the "me-first" '80s, when the new sanitation ethic might as well have been "flush it and forget it." The trade magazine *BioCycle* notes that fully half of the country's composting-toilet manufacturers operating in 1988 were out of business by 1990.

Today, the EPA's National Small Flows Clearinghouse reports a modest renaissance — for reasons both practical and economical as well as ecological. As pollution mounts from bulging cesspools and aging septic systems, composting toi-

lets are increasingly viewed as a viable alternative for homes lacking the space or the soil cover for septic leachfields.

That said, if composting toilets are to gain a wider following they'll need to overcome two stigmas: #1) Unless they look, act, and feel like the five-gallon flusher we all grew up with, we won't

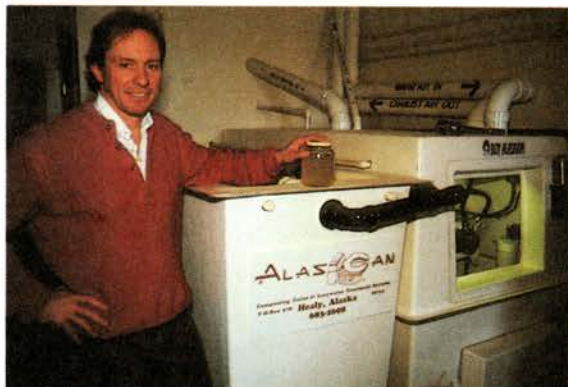
use them. #2) After the flush, the stuff doesn't "go away" to some distant plant. It's treated right in your very own basement. To witness this firsthand, GARBAGE paid a visit to Clint Elston's solar-heated home in Healy, a small mining community on the northern flanks of the Alaskan Range.



The AlasCan at Work

The AlasCan flushes into a composting tank, super-insulated to help maintain a warm environment for waste-munching aerobic bacteria and composting worms, dubbed "red wigglers." Two user-programmed, motor-driven agitators aerate the top layers and mix in fresh organic matter. Aerating the pile fuels the composting process and kills pathogens, which thrive in an anaerobic (oxygenless) environment.

Excess liquid leaching into the tank's bottom is slurped up by an automatic distribution pump and sprayed over the compost heap. A fan draws warm air into the tank; while CO₂, water vapors, and odors are exhausted through a vent. Twice annually, the homeowner removes the finished material by turning a ratchet-driven conveyor.



Alaskan inventor Clint Elston has fashioned a better composting privy.

WALK INTO CLINT'S CARPETED BATHROOM and it's hard to tell that you're about to use a composting system. There it squats, next to the vanity: a low profile, ceramic privy. Lift the seat and behold! Instead of the dark maw exhibited by dry toilets of yesteryear, there's a bowlful of foam.

The toilet was developed in Japan by Nepon, Inc. After a vigorous "field test," I gave it a flush by pressing a button on top of the water tank, triggering a computer-controlled air pump. In a few moments it all disappeared and a new foam plug formed. Less than 8 watts of electricity, a cup of water, and a few drops of detergent are needed per flush. Between flushes, the foam plugs odors and lubricates the drainage system. (For more on how it works, see illustration on p. 35.)

Down in his basement, Clint reaches into the composting tank's cleanout chamber and emerges with a handful of humus. It smells like freshly plowed earth. To maintain the unit, he need only toss in an occasional scoop of wood shavings to absorb moisture. Twice yearly, he removes a couple of buckets of finished humus.

About 90 AlasCans have been installed throughout Alaska and western Canada, including a research station built on permafrost near Whitehorse, Yukon Territory, and an oil rig that sits in the Arctic Ocean north of Prudhoe Bay. The biggest hurdle to wider use appears to be the cost.

An AlasCan greywater/composting toilet system can set homeowners back about \$10,000 or more. So the systems seem best suited for towns in the far North, where central sewers are very expensive. Also,

the AlasCan is heavily mechanized compared with other composting systems, and mechanical systems can break down. If a composting toilet malfunctions, you've got a mess.

So, can we really depend on the AlasCan? A National Bureau of Standards report, which recommended the system for a federal Department of Energy research and development grant, concludes that it's

"reliable ... the main difficulty the inventor has in marketing the product is the fact that most of the public has never heard of composting toilets..."

Considering Alaska's hostile climate and terrain, the AlasCan's ability to

recycle effluent — as opposed to dumping it or chemically treating it — is no small achievement. But Clint argues that in *any* locale, the composting privy is far more practical than centralized systems.

"With conventional treatment, we take water from a river and flocculate it, chlorinate it, fluorinate it, then pump it to various locations so we can drink it, defecate and urinate in it," says Clint. "Then we flush it through pipes to another plant where solids are removed and the water is treated with chemicals so it's clean enough to put back in the river.

"It just doesn't make sense."

— Al Geist

AL GEIST IS A WRITER AND PHOTOGRAPHER IN FAIRBANKS. HE'S CONTRIBUTED TO HARROW-SMITH, WASTE AGE, AND NUMEROUS ALASKAN PUBLICATIONS.

Duckweed Cleans Up

Ogema, Wisconsin

NESTLED IN THE LOGGED-OVER FLATLANDS of central Wisconsin, a small town named Ogema treats its septage in simple "lagoons." In these open-air ponds, a slurry of wastewater and human excreta idles away the months as it's devoured by bacteria. Although they lack the mechanical devices of a conventional treatment plant, lagoons can work well enough to meet state wastewater standards. But poor design or inadequate size spells a failing system — a nasty problem that befell Ogema in the late 1980s.

Back then, state environmental inspectors discovered that partially treated effluent from Ogema's plant was polluting a nearby cattail marsh. By 1990, regulators were ready to hit the flusher on Ogema's sewage-treatment plant: The community faced the prospect of installing an expensive system of mechanical aerators to raise the wastewater's oxygen level and hasten decomposition.

With a population of 200 and an average daily sewage inflow of just 35,000

gallons, Ogema didn't want to buy a Lilliputian version of a mechanical treatment plant. Fortunately, the scent of fetid publicity from Ogema caught the nose of Lemna Corp., a St. Paul, Minn., company that was seeking customers for its novel wastewater-treatment system.

Lemna made Ogema a straightforward proposal: Why not install a treatment system, modeled after Nature's own purifying powers, which uses duckweed to treat wastewater? Compared with other sewage-treatment methods, Lemna Corp. claimed its patented technology was easier to operate, certainly nicer to look at, and equally palatable to ornery regulators. What's more, its \$50,000 price tag was far below the \$185,000 tab for installing a mechanical-aeration system in Ogema.

The town agreed, and after a bit of haggling it persuaded state regulators to issue a construction permit on an experimental basis. By July '90, Wisconsin had its first duckweed-treatment system.

DUCKWEED IS A COMMON, FREE-FLOATING aquatic plant with a leaf about the size of a thumbtack. The 40-plus species (in the genus *Lemna*) are found in many parts of the world. Compared with other man-made marshes that treat wastewater, the *Lemna* system decomposes larger quantities of residue under anaerobic (oxygenless) conditions.

Surprisingly, Ogema's treatment regime hasn't changed much since duckweed arrived. Incoming wastewater begins to decompose during several months of settling in the primary treatment lagoon. Then it is piped to a secondary lagoon, which is subdivided into diamonds by a floating plastic grid and carpeted with bright green duckweed. This simple grid — *Lemna*'s key advance — allows the great mat of duckweed to shade the water below from sunlight. Darkness imposed by the carpet of duckweed stops photosynthesis and oxygen production. The result? Anaerobic bacteria thrive, digesting complex molecules in the wastewater slurry and expelling such harmless waste products as CO_2 and H_2O .

Duckweed has other benefits. It consumes nitrogen and phosphorous, key plant nutrients that spur algae blooms in waterways that receive treated effluent. *Lemna* Corp. says each acre of its ponds can extract annually as much as 700 lbs. of phosphorous and 5,450 lbs. of nitrogen. (One measure of duckweed's rapid uptake of nitrogen and phosphorus is that it doubles in mass every four days or so during summer.) Tests for pathogenic bacteria aren't required for Ogema, but James Hansen of Wisconsin's environmental regulatory agency suspects that bacteria are killed by their long detention in the ponds (at least 150 days).

In regulator's terms, the advantages of duckweed are measured by its ability to reduce the Biochemical Oxygen

Demand (BOD) and Total Suspended Solids (TSS) in effluent. High TSS or BOD can kill fish and promote eutrophication, excessive plant growth that steals oxygen from water bodies. Ogema's limits for both BOD and TSS are 20 milligrams per liter (mg/L). In the months After Duckweed, TSS fell from 40 mg/L to 4 mg/L; while BOD was cut from 22 mg/L to 11 mg/L.

These encouraging results have *Lemna* Corp. growing faster than duckweed on a summer day. Already, 15 *Lemna* systems are operating in 10 U.S. states. The largest, in Devil's Lake, N.D., can daily handle up to 5 million gallons of wastewater. But that 50-acre behemoth reflects a major drawback to *Lemna*'s approach: it requires more land than a mechanical-treatment system with comparable capacity. In cities and suburbs, large chunks of land are rarely available and hardly affordable.

THINGS WERE QUIET LAST JUNE WHEN I visited Ogema's lagoons, half a mile southwest of town. Operator Jim Kline was guiding several *Lemna* prospects from Indiana around the duckweed pond, answering questions and swatting deer flies. The following week a floating "harvester" was due to clip swaths of duck-

For More Information:

EPA NATIONAL SMALL FLOWS CLEARINGHOUSE, P.O. BOX 6064, MORGANTOWN, WV 26506; (800) 624-8301.

ORENCO SYSTEMS, INC., 2826 COLONIAL RD., ROSEBURG, OR 97470; (503) 673-0165.

ALASCAN, 3400 INTERNATIONAL WAY, FAIRBANKS, AK 99701; (907) 452-5257

CLIVUS MULTRUM, 21 CANAL ST., LAWRENCE, MA 01840; (800) 962-8447

LEMNA CORP., 1408 NORTHLAND DR., SUITE 310, ST. PAUL, MN 55120; (612) 688-0836.

weed from the surface. If left in place, they'd eventually choke the lagoon.

Sometime before Thanksgiving, the layer of duckweed sank to the lagoon's bottom. Because the plant hibernates during winter, wastewater is stored in the two lagoons until spring. Then the duckweed rise to the surface, triggered by the increase in water temperature and sunlight that signal spring's arrival. As they once again carpet the lagoon, the plants resume their silent, effortless job of cleaning up after Ogema's residents.

— David Tenenbaum

DAVID TENENBAUM'S SCIENCE ARTICLES HAVE APPEARED IN THE LOS ANGELES TIMES, WHOLE EARTH REVIEW, AND AMERICAN HEALTH.



In Ogema, Wis., a floating harvester clips swaths of duckweed — an aquatic plant that purifies wastewater.

ECOLOGY

MUCH OF WHAT PASSES AS "ENVIRONMENTAL DESIGN" AND "ECO-DECORATING" IS REALLY JUST ANOTHER VARIATION ON THE NATURAL-MATERIALS AESTHETIC: COTTON AND WOOL AND HARDWOODS AS A FASHION STATEMENT.

NEVERTHELESS, SOMETHING ELSE IS BREWING. FIRST, WELCOME TRUE ENVIRONMENT-CONSCIOUS DESIGN, WHERE SITE PLANNING, ENERGY EFFICIENCY, AND CHOICE OF MATERIALS ARE SEEN AS OPPORTUNITIES TO WREAK LESS HAVOC. THEN, ON A MORE PERSONAL LEVEL, CONSIDER THE HEALTH BENEFITS OF NONPOLLUTING FINISHES AND FURNISHINGS. **BY CYNTHIA HACINLI**

DECO

Energy-efficient building. Indigenous architecture. People-friendly design. Natural materials. None of these concepts is new, of course. The Connecticut Valley colonist who with his own labor built a small home of bioregional wood and put the masonry chimney mass in the center of the house was, by current definition, an "environmental builder." Only during the unprecedented building booms of the 20th century did such historical criteria lag behind the immediate need to develop housing and neighborhoods for the burgeoning middle class. ¶ Today, environmental design is gaining in popularity — and sophistication. No single builder can keep up with all the breakthroughs in energy-efficient technology; no single specifier can stay current on the "alternative" products, such as lower-toxicity finishes, hitting the market. No single expert, apparently, can even define "environmental design," which runs the gamut from cutting-edge retooling of the building process, through passive solar, and finally to eco-decorating with wrinkly "natural" fabrics. In the next pages, we'll take a look at these different aspects . . . and point to some excellent sources.

In its broadest definition, environmental building considers effects on the environment as design criteria. That would include immediate effects, such as the choice of site or building materials, as well as long-term effects, such as the environmental costs of maintenance, heating, and cooling. Much environmental building is expensive, because the houses are custom and better quality materials are chosen. While it's true that environmental design (like environmental concern) is generally confined to an elite cross-section of society, there is something to be said about the environmental benefits of quality. And, of course, many high-end innovations eventually become standard practice.

Regional conferences abound for those looking for more information on environmental design. (Contact the architecture and engineering departments of colleges, the local American Institute of Architects chapter, and energy consortiums; look for notices in both home-building magazines and environmental publications.) Nevertheless, it's still a rarefied discipline. Where "environmental design" becomes a popular concern is in the area of remodeling and home decorating. Here the distinction between environmental impact and personal ecology is often blurred — what may be better for a sensitive individual isn't necessarily better for the earth. Eco-decorating is a broad field

where you'll find passionate interest, a growing market for less polluting materials, a revival of the indigenous natural-materials aesthetic — and plenty of snake oil.

PROBABLY THE MOST BEGUILING ATTEMPT TO PRESENT ALL THESE related trends is Janet Marinelli's new book *The Naturally Elegant Home*. In the coffee table-book format of other full-color "style" books, the author introduces readers, in unexpected detail, to environmental-conscious construction, landscaping, and decorating. Unlike her organic-shelter predecessors of the 1970s, Ms. Marinelli does not eschew style and convenience in favor of ecological correctness. Good work, if it elevates taste and raises some consciousness; but there's no doubt that this book speaks to a familiar aesthetic. "Materials native to the bioregion reinforce the natural world," she says; ergo a home in Texas boasts mesquite and terra-cotta floors.

The Naturally Elegant Home devotes a lot of pages to the eco-decorating truism that says natural materials are better for personal health. For the apparently growing number of people who have adverse reactions to aldehyde-releasing carpets and particleboard, there's something to that. Although most allergic reactions are caused by natural substances, some synthetic products of the chemical industry have come

under fire. The methylene chloride in glues, varnishes, and paint strippers, and the formaldehyde found in manufactured wood products and no-iron fabrics, are suspected carcinogens. Little is known about the health ramifications of a whole class of chemicals, volatile organic compounds (vocs) found in paint and other products that dry after they're applied. Pesticides, which in *large* doses can cause a host of ills, turn up in everything from glue to sheets. It's impossi-

ble to ignore the growth of the controversial quasi-medical specialty of environmental medicine (formerly clinical ecology), which treats patients whose illness syndromes are pinned on acute and chronic environmental assault.

Indoor air pollution, especially in super-tight (usually newer) buildings, is a known hazard. (The array of

symptoms reported by occupants, from headaches and respiratory problems to neurological impairment, are referred to as Sick Building Syndrome.) The federal Environmental Protection Agency (EPA) has just begun to examine household products and materials for their contribution to indoor air pollution and associated short- and long-term health risks. Wall coatings, notorious indoor pollutants, are first on the agenda, but findings won't be available for at least a year. In the meantime, EPA officials, including Pauline Johnston of the Indoor Air Division, advocate caution. "It's a good idea to reduce overall emissions," she says. "Overall" is the key word: Short-term release of formaldehyde fumes from particleboard shelving may not present a problem. But a whole houseful of so-called "toxic emitters" is another matter.

Eco-Deco at Home

BEFORE YOU BUILD, REMODEL, OR FURNISH, CONSIDER THE environmental and health impacts of what you're doing. If you have extra cash and high anxiety, you can even hire an environmental consultant like Mary Oetzel of Environmental Education and Health Services in Austin, Texas. (Environmental consultants charge from \$60 to \$150 an hour.) "Look at how you're living, then start minimizing [toxic] chemicals in the home," advises Ms. Oetzel. "The goal should be to use low-toxicity alternatives and good ventilation, attaining [a more healthful indoor environment] in two to three years." Step by step, more radical undertakings will come up: kitchen cabinets, living room walls. Think before you leap. In the first flush of enthusiasm, it's



Eco-Couture: Got a few grand to spare? Bleached maple (above) and stainless steel (left) recycling bins by Haute House transform the mundane into high art.

easy to oversimplify issues. Some eco-deco hints follow.

WALLS

WOOD, STONE, CERAMIC AND BRICK ARE AMONG the favored materials in newer high-end homes. But most of us don't live a high-end lifestyle or, for that matter, build a home from the ground up. We have to work with what's there: usually plaster or drywall and paint, and — if one is cursed — five layers of wallpaper. Each has potential impact on health and environment.

Wallpaper is something of a misnomer, since wall covering (the current industry term) is most often made of vinyl-reinforced cloth or solid vinyl cloth, both of which may emit the plasticizer DEHP, which, taken orally, is an animal carcinogen (it's the origin of new-car smell). Furthermore, the modern adhesive used to affix sheets to the wall contains a fungicide. Low-toxicity pastes and some all-paper and fabric wall coverings exist, but even these are frequently treated with pesticides. If you're sensitive, you may want to limit your use of wall covering to accent borders, and not use it at all in the bedroom.

The greatest paint hazard — lead — is gone from recent formulations. Oil (alkyd) paints are rarely used for interiors today, due to high voc levels. Controversy continues on the health effects and environmental impact of the lower-voc, "water-based" acrylic latex paints.

Of interest are the new extra-low voc and voc-free paints already in mainstream paint stores nationwide. Glidden, a major manufacturer, calls its voc-free wall paint Spred 2000 (it contains pesticides, as do all commercial brands). Miller Paint offers

Interiors (right and p.42) designed by environmental consultant Mary Oetzel: Proof positive that eco-deco doesn't mean drab.



BACKGROUNDS: PREVIOUS SPREAD: © RFG (LEFT); © M. ANGELO/WESTLIGHT (RIGHT); THIS SPREAD: © M. ANGELO/WESTLIGHT (LEFT); © STEVE HIX/RFG

Mail-Order Mall

Your best bet for finding simple, high-quality furnishings and materials is going to be through the mail. Here's just a sampling of the companies that are springing up to meet the growing demand:

Linens and Furniture

- Audrey Nichols Originals, Box 63, Kimball Pond Rd., Vienna, ME 04360; (207) 293-2678. Colorful, decorative window quilts.
- Co-op America, P.O. Box 18217, Washington, DC 20036; (202) 223-1881. Organic-cotton-filled pillows, recycled glassware and mugs, untreated cotton rugs and shower curtains.
- Crocodile Tiers, 402 North 99th St., Mesa, AZ 85207-7118; (602) 380-3416. Untreated cotton and linen curtains, drapes, shades, table linens, bed linens, furniture throws, window blankets and quilts.
- Dona Designs, 825 Northlake Dr., Richardson, TX 75080; (214) 235-0485. Organic cotton batting, organic-cotton-filled futons, untreated comforters, innerspring mattresses, pillows, mattress pads, untreated cotton futon covers, bed linens, and furniture made with natural glues and finishes.

- Haute House, 1428 Danby Rd., Ithaca, NY 14850; (607) 273-9348. Wooden recycling stations that are objets d'art — butcher blocks, color cubes — get the catalog and see. Prices from \$470 to \$6,000.
- Jantz Design, P.O. Box 3071, Santa Rosa, CA 95402; (707) 823-8834. Organic-cotton stuffed pillows and futons. Untreated futon covers and bed linens, untreated-wool-filled comforters, kapok pillows, and wood bed frames, futon sofa slats/frames, and nightstands with non-toxic finishes.
- N.E.E.D.S., 527 Charles Ave. 12-A, Syracuse, NY 13209; (800) 634-1380. Natural-fiber, untreated pillows and comforters.
- N.O.P.E., P.O. Box 333 D, Smithport, PA 16749; (800) 782-NOPE. Untreated cotton shower curtains, and window curtains.
- Pure Podunk, R.R. 1 Box 69, Thetford Center, VT 05075; (802) 333-4505. Untreated-wool-stuffed futons, mattresses and pillows, untreated cotton bed and bath linens, unfinished hardwood furniture. Watch for expanding organic line.
- Rising Star Futons, 550 S.W. Industrial Way, Box J, Bend, OR 97702; (503) 382-4221. Futons stuffed with Cloverfill, a green fiber made from recycled soda-bottles.

Paints, Paneling, etc.

- AFM Enterprises, Inc., 1140 Stacy Ct., Riverside, CA 92507; (714) 781-6860. Non-toxic and low-toxic paints, stains, cleaners, caulk, adhesives, wax, and carpet guard.
- Auro Natural Paints, P.O. Box 857, Davis, CA 95617-0857; (916) 753-3104. Eastern U.S.: Sinan Co., 30 Selwyn Rd., Belmont, MA 02178; (617) 489-6747. All-natural plant-based indoor wall paint, beeswax, and other cleaning compounds.
- Baubiologie Hardware, P.O. Box 3217, Prescott, AZ 86302; (602) 445-8225. Low-toxicity waxes and polishes, carpet shampoos, carpet guard, paint stripper, primer, sealants for walls and woodwork, lacquer, mar-resistant finishes, adhesives for carpet and tile, and wood-staining products.
- Homasote Company, Box 7240, W. Trenton, NJ 08628; (609) 883-3300. Recycled products that don't off-gas, including wood paneling and carpet backing.
- The Natural Choice/Livos Plantchemistry, 1365 Rufina Circle, Santa Fe, NM 87501; (505) 438-3448. Natural paint powders and earth pigments that you mix, plus low-toxic enamels, less-toxic glues, paint remover, waxes, and sealer.

a product with about 95 percent less pesticide than the norm. Because of voc limits imposed by California and several Northeastern states, paint companies are paying a lot of attention to the problem — expect the selection to change.

The German company Auro makes paints from vegetable and plant extracts. These products contain vocs from eucalyptus, cypress, and citrus peel oil, which may be irritating to chemically sensitive people, but they are free of the petrochemicals many people find irritating or nauseating. Like many green products, these paints are more expensive than mass-produced commercial brands. (Five liters of Auro white interior paint, enough to cover 330 square feet of wall, will set you back \$52.)

FLOORS

CARPETING, EVEN IF IT'S MADE WITH RECYCLED pop bottles (and many big brands are), is a problem for a lot of people. Carpet backing and pads are the culprits, along with adhesives that hold carpet to backing and backing to floor. The most likely offender, 4-PC, smells awful and seems to make many people feel awful, but the

EPA hasn't concluded research on its toxicity. Furthermore, carpeting can trap other volatile compounds.

Even wool carpet is nearly always treated with pesticides to hamper moths, mold, and mildew. Anti-stain treatments, which some people can smell, may contain 2-Butoxyethanol, currently on some environmentalists' hit list.

Hardwood floors and a sparse inventory of cleanable area rugs is the recommended treatment for those allergic to dust as well as sensitive to synthetic compounds. If you're set on wall-to-wall, look for backing made from jute or recycled carpet fiber. Use tacks, not glue, to secure it. It's a good idea to buy carpet in the warm months, and unroll it outdoors for a couple of days to off-gas.

The plasticizers in vinyl floor coverings will dissipate over time, as they do with wallpaper and carpeting.

FURNITURE AND CABINETS

FINDING ENVIRONMENTALLY CORRECT FURNITURE is tricky — and expensive. Much of what we think of as wood furniture is really a combination of particleboard, plywood, and hardwood veneers. Because they are actually

wood scraps held together with glue, plywood and particleboard — found in everything from the couch chassis to the “oak” entertainment center and the “natural wood” kitchen cabinets — are major emitters of formaldehyde.

The high-end recommendation is to use solid hardwoods, a beautiful but pricey alternative with questionable benefit for the earth. Some endangered woods are still marketed; buying recycled and Smart Wood furniture when possible is desirable. Metal is another alternative, especially for kitchen cabinets.

To cut short the off-gassing of particleboard furniture, you may opt to completely seal it with a water-based urethane. The urethane itself, of course, emits solvents etc., but the work can be done in a ventilated area; once the coating is dry, it will arrest further off-gassing in your home.

Upholstered furniture that was anti-stain treated at the factory will smell less than retailer-treated furniture. Don't shy away from polyfill stuffing: Although it doesn't fit the eco-decorator's definition of “natural,” it's a low-odor plastic that requires no pesticides and may well be made from old pop bottles.

BEDDING AND LINENS

THE BEDROOM IS THE FIRST PLACE TO WORK ON LOWERING indoor air pollution. Imagine buckwheat-hull pillows, an untreated wool blanket, a down or milk-

weed-parachute comforter, and organic-cotton sheets and drapery. (Hayfever sufferers, beware.)

Untreated sheets and bedding are easier than ever to find — even Fieldcrest, Canon, and J.P. Stevens are making them. Avoid non-iron or perma-pressed sheets (the treatment contains formaldehyde). Remember: Wrinkles are eco-chic.

The Vermont mail-order house Pure Podunk suggests soaking perma-press sheets in organic apple-cider vinegar, rinsing them, and then washing them with half a cup of baking soda.

WINDOW TREATMENTS

THE USUAL FABRIC CONCERNS APPLY TO CURTAINS and drapery. Anti-fungal and permanent-press finishes are commonplace. Organic cotton or untreated silk or linen (if you can find them) are thought to have the lowest environmental impact, and probably do make the smallest contribution to indoor pollution. Choose fabrics that don't have to be dry-cleaned.

Consider energy issues as well. Brutal Northeast winters mean you want to make the most of daytime sunlight, but hold heat in at night. “Window quilts” are baffled, multi-layer decorative window covers that roll down in a tight-sealing track to cover the glass at night. They run from simple cotton bunting to appliquéd works of art.

The flea market — the oldest reuse-and-recycle method known — is a great place to pick up inexpensive used items. (If you're chemically sensitive, of course, you'll want to avoid wood furniture than needs stripping and refinishing.) The eco-chic shopper is undoubtedly close to choosing from among the attractive kitchen recycling centers now available.

Unless you're very unusual, your decor isn't killing you. As consultant Mary Oetzel says, “Humans have an ability to adapt. It's just when you get overloaded that you get sick.” Remember that even though a room represents the very essence of environmental correctness, if you don't find it comfortable, if it doesn't last, it's all a waste of resources. At the core, environmental design and eco-decorating are about thoughtfulness.

Cynthia Hacinli writes from Portland, Maine. Her previous stories for GARBAGE covered renters' rights, and electromagnetic radiation.



Books & Brochures

- *The Naturally Elegant Home* by Janet Marinelli with Robert Kourik. 256 pages. \$45 plus shipping from Little, Brown and Company, 200 West St., Waltham, MA 02154; (800) 343-9204.
- *The Healthy House*, John Bower, \$18.95, and *Your Home, Your Health, Your Well Being*, David Roussard, William Rea M.D., Jean Enwright, \$20.95 from Dickey Enterprises, 109 W. Olive, Fort Collins, CO 80524; (303) 482-6001.
- “The Inside Story: A Guide to Indoor Air Quality,” U.S. Environmental Protection Agency, Office of Air and Radiation, Washington, D.C. 20460
- “Stripping Paint from Wood,” “An Update on Formaldehyde,” and “Biological Pollutants in Your Home,” all available through U.S. Consumer Product Safety Commission, Washington, D.C. 20207.
- “American Institute of Architects Environmental Resource Guide,” quarterly, with information on tropical woods, indoor air quality and other environmental issues. American Institute of Architects, 1735 New York Ave., NW, Washington, DC 20006; (202) 626-7300.

HOME, RECYCLED HOME

by Lilly Tuholske

SINCE MOVING HIS FAMILY INTO THE home he built in western Montana last spring, Steve Loken has had more than 6,000 guests. It's not that Mr. Loken is a party hound. He is, however, determined to show off his new digs.

That's because the components of his home — from the cool-blue bathroom tiles made of recycled automobile windshields, to high-performance (R-7.2) windows — represent a collection of some of the most environment-conscious building materials on the market today.

For the past decade, Steve Loken has been earning his green stripes by building energy-efficient homes, and working for state and federal home energy-conservation programs. But he is committed to taking household environmental consciousness far beyond the notion of saving energy.

"In housing, we have to find ways to expand and extend our resources," he says. Minimizing wood consumption is just one of the ways Steve does that. The 2,400 square-foot house used just one-fifth of the 11,000 board feet of lumber that a similar-sized conventional home would require. Such a savings is important, says Steve, when you consider that new housing and remodelling eats up about 70 percent of the nation's lumber.

Instead of studs and joists, RecRAFT 90, as the house is known, uses structural panels. Made of chips from small, fast-growing trees, these panels use less wood fiber overall. They eliminate the need for old-growth trees, which are usually the only trees big enough to produce long, straight lumber for house-framing. And they form a sandwich, with insulating foam or paper honeycomb in between, giving them good structural properties, as well as built-in insulation.

Other innovative materials that replace wood in the house include fiber-

glass-composite window frames and siding, and roof tiles made from ground sand, wood fiber, and cement.

Using less wood also results in homes that don't settle and warp, says Steve, and that are more durable and less likely to need maintenance. The RecRAFT roof, for example, is not only nonflammable, but it comes with a 60-year warranty — about twice that offered on conventional [asphalt] roofing. That kind of durability, he says, translates directly into savings of natural resources and time.

Artfully designed to take advantage of a southern exposure, RecRAFT 90 is one of the classier dwellings recently built on the mountain slopes above Missoula. Yet it's filled with garbage. The plush carpet is manufactured with 100 percent recycled PET plastic; the pad is made from used tires. Old newspapers show up in the drywall, insulation, and shelving.

Steve Loken has combined forward-looking technology with a healthy dose of thrift. He salvaged the maple flooring in the dining room from an old church; the window trim, from wooden stadium bleachers; and the staircase balusters were fashioned from his 18-year collection of old doors.

"In this recycling mania that is sweeping the country, we are so caught up in new technology that sometimes we forget that we can reuse or salvage things,"

says Steve. "And that's the thing we should be doing first."

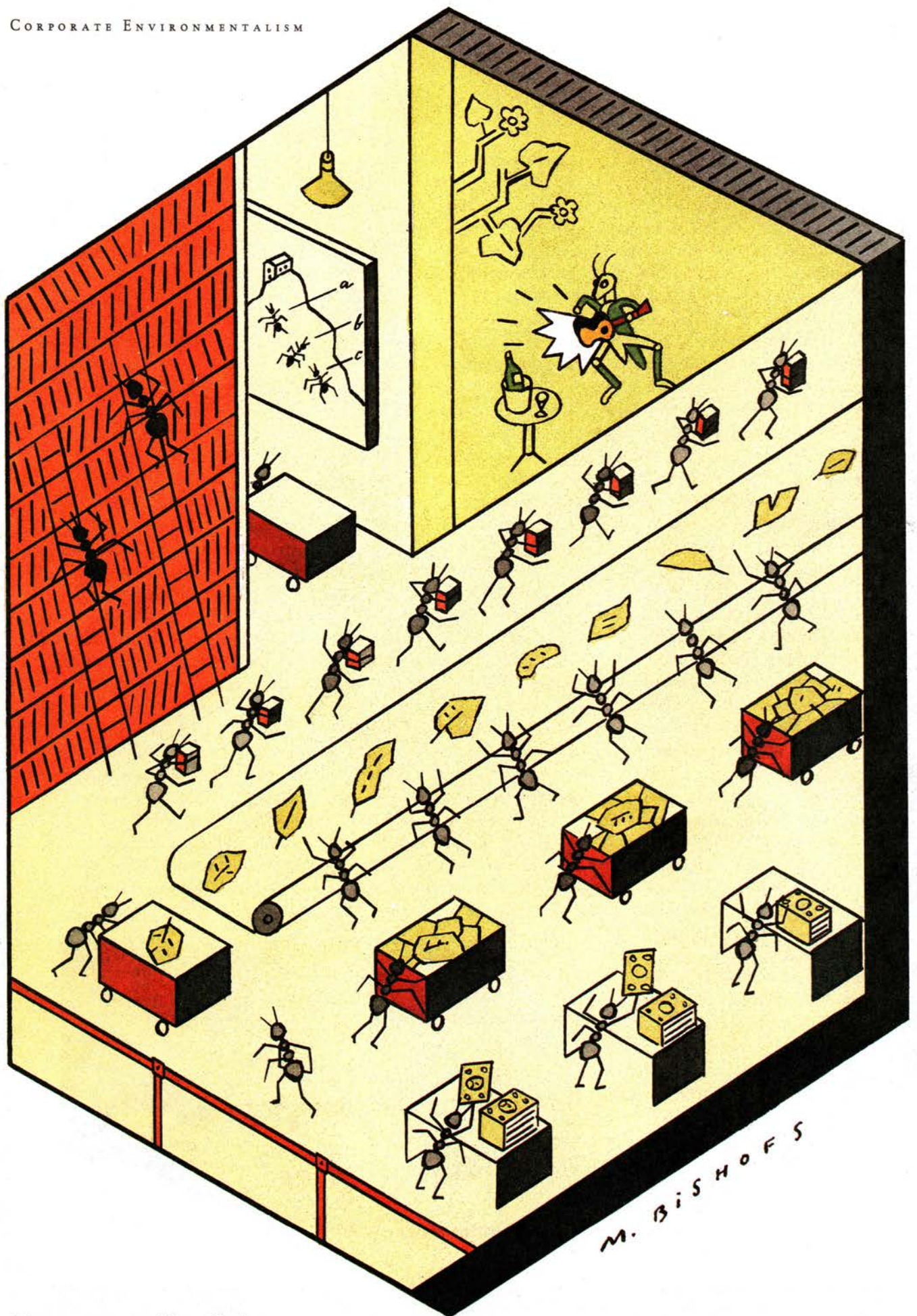
RecRAFT 90 cost about 15 to 20 percent more to build than a conventional home. Steve attributes about half of the increased costs to freight charges he incurred shipping hard-to-find materials to a small Montana town. He predicts that as the materials used in RecRAFT 90 become more widely in demand, they'll be more readily available — and cheaper.

With RecRAFT 90 finished, Steve Loken is turning his sights to other communities. Two years ago, he founded the Center for Resourceful Building Technology (CRBT), a non-profit information clearinghouse to spread the word on greener building techniques.

With CRBT's research coordinator, Walt Spurling, Steve has written the "Guide to Resource Efficient Building Elements," an 83-page book listing manufacturers of everything from resource-efficient roofing to wallpaper made of recycled newspaper. The guide is available for \$20 from the Center for Resourceful Building Technology, P.O. Box 3866, Missoula, MT 59806; (406) 549-7678.

Lilly Tuholske writes from Missoula, Montana. Her work has appeared in *High Country News* and the *Missoulian*.





The Ant, the Grasshopper, and the GNP

BY ART KLEINER

As long as our national accounting system omits environmental costs,
the GNP will remain a gross national parody of our real worth.
Enter the grasshoppers — environmental economists who are leading
the quest for a GNP that includes ecological values.

DO YOU REMEMBER THE AESOP FABLE ABOUT THE ANT and the grasshopper? When I was a child, adults would employ the tale to terrorize me. Unless I devoted my life to accumulating wealth, they said, I'd end up hungry and cold like that forlorn, ne'er-do-well hopper. ♪ Recently I looked it up, and discovered that the grownups had it all wrong. The story is really a warning about learning to measure what we value. The best things in life — intangible goods like health, clean air and water, biological diversity, quality of life, even moral integrity and passion — aren't free. It's just that their costs are hidden from the marketplace. ♪ Society doesn't factor the cost of, say, natural-resource extraction into its financial balance sheets. But when intangibles like environmental quality start influencing the price of everything we buy or sell — as several key participants in President Bill Clinton's December economic summit proposed — the fable of the ant and the grasshopper will be more apropos than ever. ♪ Recall that the fable begins in winter. The ants finished gathering their corn long ago. Now they are obsessively counting and hoarding it, trying to make it last through the bitter cold. Along comes a bedraggled grasshopper who begs for a few grains, "because I'm simply starving." ♪ The ants halt their work, "though this was against their principles," Aesop tells us. "What did you do with yourself all summer?," asks one ant. "Why didn't you collect food?" ♪ "I was so busy singing," replies the grasshopper, "that I hadn't the time." ♪ Shutting the passage to the storeroom, the ant sneers, "If you spent the summer singing, you'll spend the winter dancing." ♪ Then comes

Art Kleiner is a regular contributor to GARBAGE magazine's series on corporate environmentalism. He lives in Oxford, Ohio.

the moral: "Prepare today for the wants of tomorrow." But like most morals to Aesop's fables, this was almost certainly added centuries later. Aesop — to judge from the little we know about him — was at least partly a grasshopper himself. He was a slave turned wandering diplomat, renowned for his misshapen ugliness and his story-spinning skill. He often depended on the good-natured charity of his hosts. It's hardly the background of a work-ethic personality.

Not that there's anything wrong with the work ethic *per se*, but if Aesop wanted his listeners to emulate the ants, why did he make them so mean-spirited and bitter? Was he arguing that only misers should thrive? More likely, he concocted the fable to reconcile the two points of view — to prod some greedy potentate into looking beyond his hoard. Aesop might have argued that the grasshopper was not just a beggar, but an inherent part of the ants' world; if it died, they might miss its serenading next year. Or in some ecological fashion, perhaps by consuming a weed, the grasshopper might help make the grain more plentiful. Should not the ants include the intrinsic worth of such outside, uncertain factors when calculating their hoard's real worth?

Free-Market Environmentalism



TODAY, 2,600 YEARS LATER, SOME ANTS ARE STILL STRUGGLING TO CALCULATE accurately the worth of work. We know them as economists. There are grasshopper-equivalents as well, particularly among the 1960s-influenced people who form the core of the environmental movement. Just as in Aesop's fable, the two sides misunderstand each other so thoroughly, they can barely help but clash. The clash

is extra-virulent among a subgroup of economists whose influence burgeoned during the Reagan era: the free-market ants who argue that environmental grasshopperism is a form of tyranny.

It's important not to dismiss the free-marketers as greedy apologists for corruption. By their own lights, they're a passionately idealistic group, arguing that the right to own property and use it as you wish is the basis of liberty. For them, regulations like building codes, zoning laws, and (notoriously) wetlands-use restrictions aren't just inconvenient — they're totalitarian. Furthermore, because people truly care only for what they own individually, and abuse any property which they own collectively, all government land should be sold off — even such important common resources as rivers. In a free-market world, river-owners would charge other people for fishing, transit, water, and the right to dump pollutants. Since unpolluted water is worth more, the price of pristine rivers would rise — and illegal dumping would become trespassing. Instead of a weakly enforced government rule, dumpers would face civil court lawsuits from vigorous river landlords.

"Why is the water polluted now? Because no one owns it," argues Kent Jeffreys, a policy analyst for a think tank called the Competitive Enterprise Institute, which has taken on environmentalism as its own *bête noire*.

But to environmentalists, the issue of a river's ownership is irrelevant compared to other factors: the river's watershed range; the flora and fauna which depend on it; its effect on the lake or ocean where it feeds; its history of abuse. The vital thing is making sure, at any cost, that the river is not misused no matter who owns it — that people have access to its banks, and that the water

Putting Environmental Economics to Work

Environmental economics will first be put to the test in Los Angeles, where a plan to set up a trading market for factory emissions could go into effect as early as this summer.

The plan, entitled "Regional Clean Air Incentives Market" (RECLAIM), was unveiled last November by the South Coast Air Quality Management District, a southern California environmental agency. It must still be approved by other state agencies. Moreover, three environmental groups (Coalition for Clean Air, Sierra Club, and Citizens for a Better Environment) sued to have it

toughened or eliminated. But if RECLAIM is enacted it will either show that market incentives can stop pollution, or that they're ineffective compared to government regulation.

The plan sets up permits for companies to emit three different pollutants — nitrogen oxides, hydrocarbons, and sulfur oxides. All are prevalent in Los Angeles' air: the first two add to the ozone in smog, while the third is a key component of acid rain. About 2,000 companies will be eligible at first, all producing four tons or more of each pollutant.

Each company gets a

share of "free" pollution, based on its previous record of emissions; thereafter, if it cuts pollutants further, it can sell its rights to a less efficient company. If it pollutes over its limits, the company will be fined. (The penalties will be lower than current regulations require, but they'll be easier to enforce.)

Environmental groups can also buy pollution rights, boosting the price and making it even more valuable to cut pollution. Anyone will be able to trade on a pollution-rights futures market, possibly administered by the Pacific Stock Exchange.

Some companies may strike it rich selling pollution rights. Others may move to Nevada or go out of business, with Arco and Southern California Edison (the two most vocal corporate supporters of the plan) buying their rights. Still others will decrease their emissions, in part through the laudable act of redesigning their manufacturing plants from the inside. One probable effect: the end of community dry cleaners in Los Angeles, since dry cleaners will need to invest in expensive equipment to eliminate perchloroethylene, a suspected human carcinogen.

is clear of pollutants. How could an owner, pressured and harried by profit concerns, guarantee the quality of a river where so many non-owners hold a stake?

Environmentalists argue that many owners would be tempted to duck the costs of cleanup, and make a quick killing at the expense of a shared resource. Some environmentalists go further: Even if property owners earned their wealth honestly, like the ants, and protected their long-term wealth as diligently, does that give them the moral right to deny grasshoppers access to a life-supporting resource? This argument provokes the free-marketers' greatest fear: a world of government-coddled grasshoppers, supported by an ever-shrinking band of hardworking ants.

Can environmentalists and free-marketers be reconciled? Prodded, in part, by the debate between the ants and the grasshoppers, a group of latter-day Aesops is preparing to do just that.

Reinventing the GNP



OVER THE LAST FIVE YEARS, A NEW FIELD CALLED "ENVIRONMENTAL ACCOUNTING" has emerged — championed by, among other people, Vice President Al Gore. Environmental economists propose that the value of forests, minerals, clean air and water, and other natural resources be factored into economic measurements. Traditional economists call such factors "externalities" — a revealing term, because it means that they exist outside the standard calculations of wealth. Externalities have nothing to do with the trading of goods, the assigning of prices and costs, or the measurement of property value. No matter how important they are to quality of life, government and corporate policy-makers traditionally ignore them. As a result, not only are most large-scale policies and investments misguided, but the yardsticks we use to judge their success are shortsighted.

Consider the Gross National Product. It's used by every newspaper and government agency as a barometer of financial progress, but it hardly deserves its pedestal. It dates back only to World War II. Military strategists needed a quick way to estimate our capacity to produce war matériel, so they devised a measurement of all over-the-counter transactions.

The GNP attempts to tally every price and wage paid in the country; but it omits anything that's unpaid, from housework to cocaine sales to barter. Nor does it distinguish between constructive and destructive investment. If you tear down a forest, only the price of the lumber shows up. The accounting ignores all other losses — damage from erosion, diminished impact on greenhouse gases, fewer recreation opportunities, lost habitat. Under current accounting methods, shareholders can reap profits from an exploitative company, and sell their shares long before any of the devastation affects the company's balance sheets. If the forest is replanted as ecologically-diminished "tree farms," the losses may never show up on paper.

Proposals to incorporate external values into monetary accounting practices have circulated since the War on Poverty days. In the mid-1980s Herman Daly, a Louisiana State economics professor, introduced his "Index of Sustainable Economic Welfare" (ISEW). It's a device for comparing each nation's quality of life (for an average citizen). Along with wages and prices, the



In a free-market world, river-owners would charge for the right to dump pollutants. Instead of a weakly enforced government rule, dumpers would face civil court lawsuits from vigorous river landlords.

ISEW includes such key factors as the depletion of natural resources, environmental damage (including noise pollution and the loss of farmland), and commuting costs.

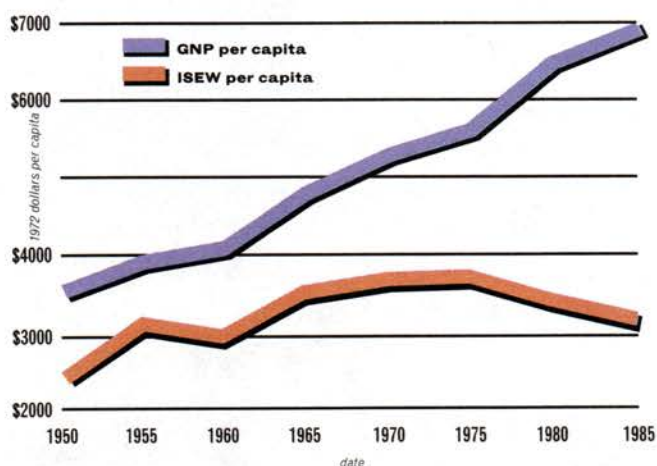
In his 1989 book *For the Common Good*, which he coauthored with theologian John Cobb, Prof. Daly plotted the two measurements across 35 years. In the resulting chart (p. 48), GNP represents America's fantasy about itself: we appear twice as well-off in 1986 as we were in the 1950s. But ISEW shows our prosperity peaking around 1976, and declining slightly ever since. The reason for the drop, according to Prof. Daly's book, is largely because the value of American soil, water, and forest has decreased steadily.

Although Prof. Daly didn't participate, an ISEW-like redefinition of economic measurements came up several times at Mr. Clinton's economic summit. And it usually sprang from the lips of corporate executives.

Dow Chemical's CEO Frank Popoff spoke of incorporat-

ing the "full environmental cost" of every product in its price, so that consumers would pay extra for environmentally damaging goods. Part of his motivation, he admitted, was to avoid "Superfunds and sons of Superfunds for the future." (He didn't mention it, but health hazards from breast implants, which rocked Dow's subsidiary Dow Corning last year, must also have been on his mind.)

A GNP that's Accountable?



Calculated across 35 years, each line depicts estimates of an average American's share of prosperity. The top line shows Gross National Product per capita. The bottom line shows Herman Daly's "Index of Sustainable Economic Welfare." While the GNP suggests that prosperity has increased almost relentlessly since the 1950s, the ISEW gives a much bleaker picture, because it blends in quality-of-life measurements.

Regardless of Mr. Popoff's real agenda, his words made a palpable difference to summit observers. Nor was he alone. A few minutes later, Alcoa's chief executive called for a gasoline tax (one of the environmental economists' most controversial proposals). And a small business owner named Mary Ann Mills implied that food prices should incorporate the replacement costs for "the eroded topsoil of Missouri." To do so, many agreed, would require a new tax system.

Real World GNP

IF INDEED THE GROSS NATIONAL PRODUCT AND THE TAX SYSTEM ARE redefined along the lines proposed by environmental economists, what would change? Would it improve our economic health?

If a raft of environmental-economic polices somehow gets passed during Clinton's hundred-day honeymoon, it would probably take three forms: tax codes which recognize environmental effects; mandates for new types of accounting formulas; and laws tagging the responsibility for environmental liabilities more securely to each product's manufacturer.

Taxes would probably be first. Government would tax income less and consumption more — particularly when consumption claims forests and minerals. The point is not to convert

people to environmentalism, but to improve their behavior regardless of whether they care about the environment.

"Consumers would make appropriate choices without having to read GARBAGE or pay attention to Green Seal," says University of Maryland ecologist Robert Costanza, one of the foremost promoters of environmental economics. "All of that information would already be incorporated into the price of what you'd buy."

Inevitably, this would level the playing field between low-priced virgin goods (like paper from "free" forests) and higher-priced recycled goods (which bear the costs of the trucks that carry them and the people who sort them). If it's more profitable to sell recycled goods, conceivably the number of recyclers would grow and take advantage of economies of scale. If the cost of paper and plastic increases then the cost of packaging would increase, which suggests that packaging itself would diminish. Innovation, say the proponents, would leapfrog, particularly in recyclable plastics, renewable energy, and manufacturing with less material.

Most likely, the gas tax would also rise — not, as Ross Perot proposed, to reduce the deficit, but to reduce oil consumption. Energy conservation has steadily grown in political importance since the Gulf War. Now, its adherents are busy marshalling their statistics, realizing that they may never have as good an opportunity to get a gas tax passed. The most likely tax would not just cover gasoline, but any carbon-based emissions that would increase greenhouse gases.

On the free-market side, Kent Jeffreys' group, the Competitive Enterprise Institute, is also getting its statistics together. The CEI is known for its battle against federal fuel-efficiency (CAFE) standards, on the grounds that big, gas-hogging cars are inherently safer in collisions. CEI and other free-marketers will attack gas taxes with similar vehemence, and the likely result is a stalemate — a tax that rises so slowly that it doesn't affect our dependence on the automobile, as environmentalists hope.

In the industrial and agricultural worlds, Messrs. Daly and Costanza propose that manufacturers be required to post a "precautionary pollution bond" when they open a new plant. After a reasonable period the deposit would be returned (with interest), minus the costs of environmental damage traceable to the plant.

For farmers, water and pesticide subsidies would decrease, while their incentives to use more efficient technologies would rise. Farmers' supports would no longer be based on pure production — the amount of acreage planted — but on the quality of care for the land. Research funding might shift from pesticides, which will no longer be considered "cheap chemicals," to ecological soil regeneration.

After a while, economic statistics would show more of what most GARBAGE readers probably take for granted: economic prosperity depending upon the level of environmental quality. Indeed, several elected officials (including Mr. Gore) have proposed that the United Nations revise its international statistics to reflect environmental quality. If that occurs, then every country that inordinately depletes forests, soil, and water resources would sink in comparative national ratings. The ant-like countries of Malaysia and Singapore, with their rapid use of resources, would drop the most. Australia and Sweden, which have pio-



neered sustainable forestry and minerals practices, might rise. Whether this would change any country's political policies is unclear, but it would affect international aid. For example, fewer dams and more wind farms would be funded.

Ants vs. Grasshoppers



A SUDDEN CHANGE FROM A SYSTEM THAT REWARDS EXPLOITATION AND obsolescence to one that encourages frugality and conservation won't occur without a fight. It's a tribute to the general murkiness of economics that the battle is so fierce and yet so muddled.

Free-marketers whom I've spoken with agree that the GNP is outdated: "an atrocious, macro-economic tool for government control of the economy," says Mr. Jeffreys. But they argue that alternative schemes like ISEW are just as dangerous. ISEW includes dozens of subjective judgments about the value of, say, an hour of household work or a square mile of old-growth forest, which would now become enshrined in government policies. In the next few years, you'll hear right-wing politicians charging that these accounting ideas are politically motivated, liberal schemes to "get the oil companies" or undermine nuclear power.

Not all environmental accounting advocates want to see the government take center stage in redefining the GNP. Some advocates, like futurist Hazel Henderson, argue that the media should do it instead, not with a single indicator of environmental health, but with dozens. Ms. Henderson imagines a utopian TV newscast which would linger over all the statistics: "The ratio of the military budget to the civilian bud-

The GNP attempts to tally every price and wage paid in the country; but it doesn't distinguish between constructive and destructive investment. If you tear down a forest, only the price of the lumber shows up. The accounting ignores all other losses.

get went down this week, while literacy went up and soil erosion and infant mortality held steady." People would debate the surges and drops in purchasing power the way we debate, say, election returns and sports scores.

The quest for a new GNP is beginning to provoke a national dialogue about values — about guaranteeing not just the right to property, but the opportunity to live sustainably in a relatively clean environment. Factoring environmental values into the GNP will require an unprecedented change in economic policy — one that incorporates the best of ant-ness and grasshopper-ness. It will require a faith in government as a moral leader. After all, argue environmentalists, governments should promote long-range economic values because no one else will. Indeed, our current "free" market is itself based on values set by government leaders long ago. If environmental economics fails, it'll be because past abuses (or perceived abuses) by government make too many people unwilling to trust it in the future.

Aesop tried the same thing in his day. Unfortunately, he was murdered for his trouble — forced off a cliff by the minions of a king whom he had offended. Perhaps environmental economics will fare better this time around.



Trout Living in America

RAFTING THE SWOLLEN BITTERROOT RIVER IN MONTANA'S Lee Metcalf National Wildlife Refuge, we expected to see eagles and beaver and muskrat, deer, and maybe even a moose. Imagine our bemusement when, rounding a bend, we came upon what looked to be a traffic jam on the east bank, frozen there in the 1940s. The rusted hulks of cars and pickups, stacked three and four high and lashed together with heavy cables, were only partially covered with sand and gravel. Driftwood, cottonwoods, and willows



poked through the metal skeletons. It could have been the graveyard of an extinct race of mammals, their chrome-plated teeth glittering in the sun of a later era.

The strange berm vanished from sight, only to be replaced by a similar construction on the opposite bank. This one stretched 200 yards downstream, ending at a railroad trestle. What was it? an experiment in recycling? an accident of habitat enhancement?

I sought out rancher George Ruffato, whose family has owned the east bank upstream from the railroad crossing since 1917. In the 1950s, he recalled, representatives of the Burlington Northern Railroad visited the farm with a tale of woe: The Bitterroot River, long eager to embrace a new channel, had taken a notion to turn right — directly into the railroad bridge's

east abutment. Burlington Northern wanted to force a return to the straight and narrow, and offered to build the berm for free. As the river was also gnawing at his ranchland, Ruffato ok'd their proposal.

The railroad company devised a decidedly unnatural method for their rebuttal to nature: Eroding banks would be shored up with auto bodies woven together with steel cables scavenged from the mines in Butte. Most of the local junkyards were cleaned out for the project, Ruffato told me.

I occasionally return to Tin Can Alley, the local appellation for the chrome-laden berm, each time seeing more of its anachronistic magic. The junkers are a multiplex wildlife apartment house: Fish occupy the basement. Rodents claim the middle floors. Trees and bushes make up the growing top level.

*Unnatural restoration:
Clunkers shore the banks of
Montana's Bitterroot River.*

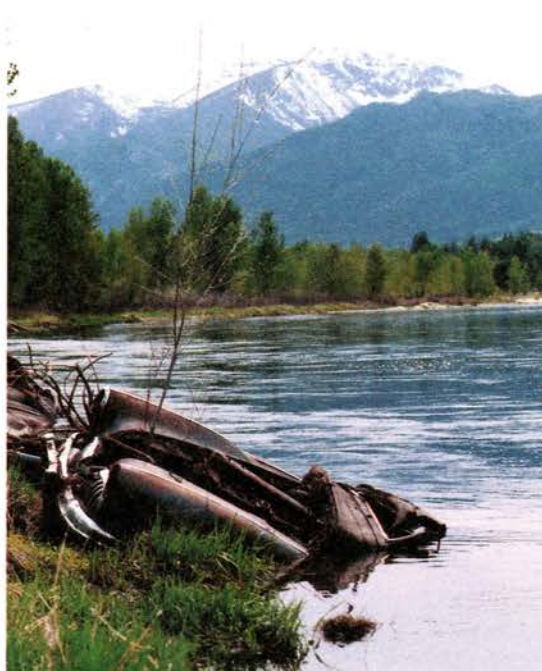


el, providing homes for songbirds, as well as eagles, hawks, and kingfishers who prey on inhabitants of the lower levels.

Turns out I'm not alone in my fascination with the Alley. Trout-fishing guides lead their clients there to catch the Big One. The local chapter of Trout Unlimited says the cars that remain submerged during low water are an especially valuable fish habitat.

What's certain is that the berms have been effective. The wrath of 35 years of floods have left them largely intact. More impressive, they've survived the storm of public controversy. Everyone agrees that such a project could never be built today. Then again, no one I've met suggests the junkers be hauled away.

Steve Coffel is author of But Not a Drop to Drink, and co-author of Indoor Pollution. He hails from Florence, Montana.



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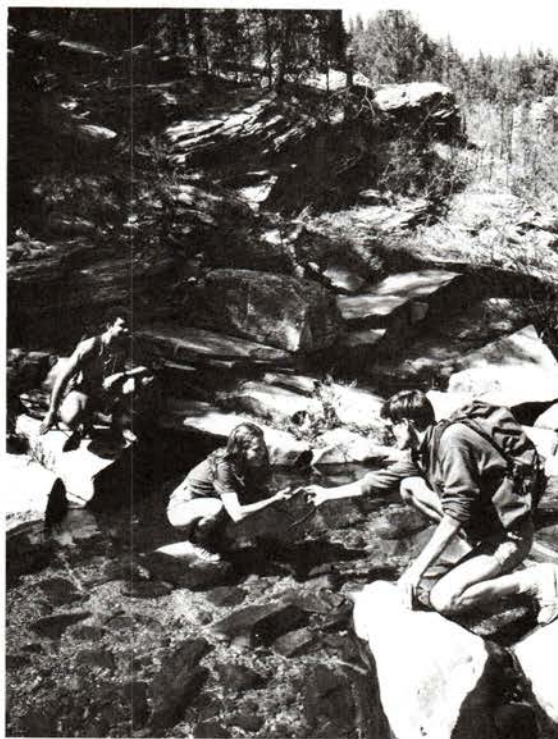
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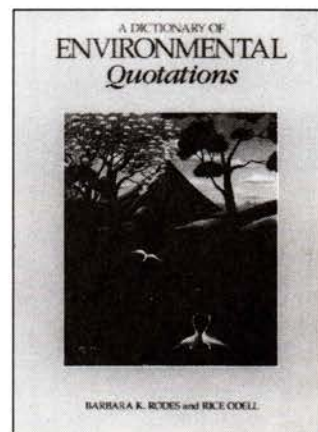
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The "Birds of a Feather" cards are somewhat different. First, they feature exotic birds, and a blurb at the bottom of each card details

the species' habits and habitat. Second, the instructions lay out an Old-Maid-style game, with the dreaded "cage card" being the one to avoid. Third, though my grandmother's deck had much more realistic bird portraits, it wasn't made with recycled paper. However you play, there's fun to be had here!

U.S. \$4.99 ppd. from: Family Games, P.O. Box 97, Dept. GM, Snowdon, Montreal, Quebec H3X3T3 Canada; (514) 485-1834.

Refrigerator Face Lift

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which translates into \$30 per year saved, as well as 1,000 avoided pounds of carbon dioxide emissions, and 10 avoided pounds of sulfur oxides. If you don't own a hacksaw, figure the cost of one into the price. \$29 ppd. from The Conserve Group, P.O. Box 1560, Dept. GM, Bethlehem, PA 18016-1560; (215) 691-8024.

Staple Saver

THIS GADGET SHOULD BE a staple (so to speak) on the desk of any consumption-conscious paper pusher. The Paperlok is a staple-less stapler — not that discarded staples are choking the landfills of America, but it makes a point. The steel Paperlok munches papers in such a way that little

paper tabs hold them together.

A real benefit may be that the high-end office paper you collect for recycling won't be contaminated with steel, which recycling mills have to screen out. (Mills will still be screening everyone else's staples, though.) Paperlok is a little fussier than a stapler — for best results, you must align the papers, fold down a corner, then munch through the layers.

For product # A018D, specify red, gray, or black. To order, send \$17.70 ppd. to Walden's, 1 American Way, Dept. GM 293, Roanoke, VA 24016; (800) 336-4460.



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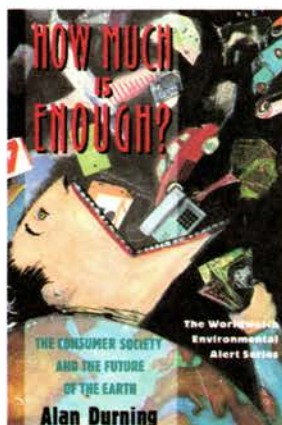
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RESOURCES

How Much Is Enough?

The Consumer Society & the Future of the Earth
By Alan Durning. 200 pages.
Worldwatch Institute,
1776 Massachusetts Ave., N.W.,
Washington, DC 20077-6628;
(202) 452-1999.
Softcover, \$8.95 ppd.

HOW MUCH MONEY would be enough for you? According to an ongoing, informal poll by an oil heir, a large number of us think all would be well if we just made twice what we make now — whether that's \$10,000 or \$100,000.



So begins Mr. Durning's look at consumption patterns the world over. *How Much Is Enough* marshalls all the usual Worldwatch data on resource use, transportation, nutrition, water, and the state of the environment,

then juggles it to find a balancing point: At what level of consumption can all the people of the world have enough ("enough" being somewhat synonymous with "environmentally sustainable")?

The last portion of the book explores a "culture of permanence." Mr. Durning speaks glowingly of shorter work days and more free time as the economy heaves a sigh and stops grinding out so much stuff. He profiles people who have taken the leap, and now live happily on \$500 a month. He quotes Ben Franklin, who said, "There is nothing in [money's] nature to produce happiness ... Instead of filling a vacuum, it makes one." Well, Ben, easier said than done. This book lays out the difficult questions we'll have to answer before we can settle on what is enough.

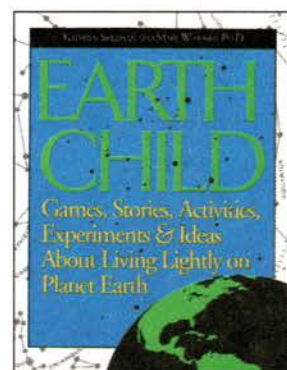
Earth Child:

Games, Stories, Activities, Experiments & Ideas About Living Lightly on Planet Earth

By Kathryn Sheehan and Mary Waidner, Ph.D.

327 pages. Council Oak Books, 1350 East 15th St., Tulsa, OK 74120; (800) 247-8850. Hardcover, \$26.95 ppd; softcover, \$18.95 ppd.

THIS BOOK BELONGS NEXT to Mother Goose on every family's bookshelf. It's scientific without being stiff. It's emotional and creative without being dippy. It suggests a low-consumption



lifestyle without making rules. And it's fun! Designed for parents or teachers, *Earth Child* will fill the hours of the day with experience, entertainment, and creativity.

The book launches into the most complex concepts with exuberance. The "Day and Night" chapter addresses everything from solar radiation to time, planetary rotation, the food chain, weather, and nocturnal animals. The authors capture

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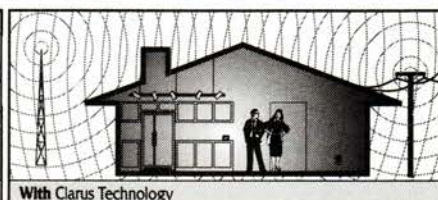
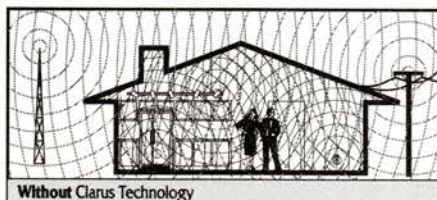
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Terry Cole-Whittaker, Inspirational Speaker, Author

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these abstractions in projects like: making a solar hot-dog cooker from an oatmeal box; finding a rainbow in a spray of water; making a paper windmill; making sun tea and raisins.

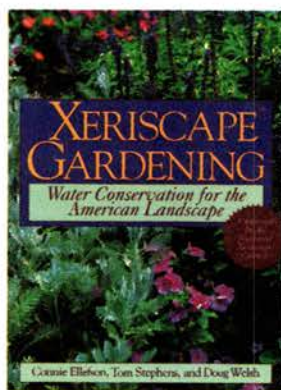
An inspired addition to the hands-on projects are the sections that help children to identify with nature. Children are led to imagine they're a smidgen of solar energy moving up the food chain. Or, in an exercise on compassion for creatures, they pretend they're animals in a zoo — as the "caged" children grow increasingly bored and frustrated, they're given a toy; then a playmate. Each chapter (habitats, gardening, trees, water, extinction, and more) closes with a guided, pre-nap fantasy, like swimming with a whale, or foraging with a panda bear. The whole book is peppered with recipes, songs, and hundreds of books and resources. Get the hardcover — it's going to see a lot of use.

Xeriscape Gardening:

Water Conservation for the American Landscape

By Connie Ellefson, Thomas Stephens, and Doug Welsh, Ph.D. 322 pages. Macmillan Publishing Co., New York, N.Y. Hardcover, \$30 plus shipping from (800) 323-7445.

XERISCAPE, A TRADE-mark word of the National Xeriscape Council, refers to landscaping that promotes water conservation — and this one is, at last, an excellent reference for both home gardeners and landscape professionals.



A xeriscape doesn't have to be an arrangement of colored gravel, or a herd of cacti, as this book proves. With a rational, restrained use of irrigation water, landscapes can be colorful and attractive throughout the year.

Home gardeners will appreciate the solid review of all the basic design guidelines presented here, as well as the incorporation of some revised rules of landscaping and maintenance — for example, it's no longer advised that you dump piles of compost in a tree's or shrub's planting hole. I'm also impressed with the list and discussion of potentially invasive and pesky plants, which many books fail to address. Nor is the lawn arbitrarily ignored: All readers will benefit from the review of drought-resistant grass

species, and the maps showing where each thrives.

The bulk of the book consists of detailed, regional plant lists, provided for 12 environmental and climatic zones. These are accompanied by a discussion of the zone, and interviews with experienced gardeners in the region.

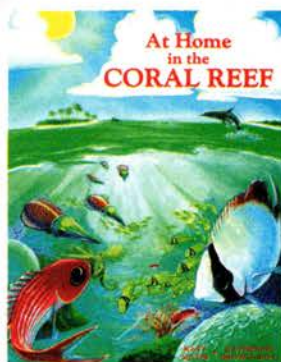
— Robert Kourik

At Home in the Coral Reef

By Katy Muzik, illustrated by Katherine Brown-Wing. 30 pages. Charlesbridge Publishing, 85 Main St., Watertown, MA 02172; (800) 225-3214. Hardcover, \$16.45 ppd.

THIS COLORFUL AND lively book introduces children to the fragile and fecund ecology of coral reefs.

The story line comes from the perspective of a cute, pink planula (a baby coral) who's searching for a place



to call home. Our hero (who, to the untrained eye, looks rather like a glob of Pepto Bismol) checks out a lagoon, a mangrove swamp, a beach,

and a polluted spot, before settling down. In the course of the odyssey, we meet countless other strange creatures, and learn about what reefs need to stay healthy.

The New Organic Grower's Four Season Harvest

By Eliot Coleman. 224 pages. Chelsea Green, P.O. Box 130, Post Mills, VT 05058-0130; (800) 639-4099. Softcover, \$17.95 plus postage.

IF YOU THINK YOU NEED A greenhouse to harvest fresh salad greens all winter, it's time to think smaller. Think window-box size. If you're really ambitious, think cold-frame.

Eliot Coleman, master of the covered garden, scoffs at snow, lays out every nail, bolt, and seed you'll need to put produce on the table in January. You can grow Belgian endive under the sink, spinach under a cold frame, or beets under a plastic tunnel.

Besides laying out diagrams, building plans, and planting charts, Mr. Coleman holds forth with simple eloquence on such subjects as compost, diet, even "produce envy" — the emotion you experience when you compare your small, bug-chewed lettuce heads to the huge, over-fertilized noggins in the supermarket.

— Reviews by Hannah Holmes



De-Icing is De-Pain in De-Butt

I'VE NOTICED THAT MAINTENANCE CREWS HAVE STOPPED salting icy roads near our protected watershed areas. What's wrong with salt? And what can I use as a substitute?

R. CARTER

Putney, Vermont

WHEN PLOTTING STRATEGY FOR SURVIVING the winter without injuries — whether you're planning for the whole town or just your own front stoop — salt is an appealing weapon to have in your arsenal. Just wing some salt de-icer around and watch the effects a lowered freezing point has on your enemy. Unfortunately, salt can also pose problems for the local ecosystem. When sodium chloride concentrates in soil, it keeps plants from absorbing water, a fatal blow. And when the salt washes into streams, the high salinity can be harmful to fish and other aquatic life. (They're not called fresh-water fish for nothing.) While the amount of salt you put on your front steps and driveway is small potatoes compared to what a municipal road crew spreads, there's no reason to add to the mess if you can help it.

Salt also eats away at the kind of concrete many driveways and front steps are made of, as well as limestone and soft (low portland-cement) mortars, leaving them pocked and eroded. Prolonged heavy use can even cause structural damage to a home's cement foundation.

One common-sense alternative to de-icing with salt is hacking away as best you can, then spreading something gritty to improve traction. There are no major environmental drawbacks to elbow grease and sand. Wood ash can also work, though you have to be fairly liberal with the stuff. Be forewarned: the nutrients (potassium

and magnesium among others) in the ash will fertilize whatever grows near your driveway — normally weeds.

Clay kitty litter is a third gritty option. Go for the plainest brands you can find: no need to introduce perfumes and binders to your local ecosystem, and they won't help with the ice anyway. Heavy use of these traction builders by the whole neighborhood might increase particulate levels in nearby streams, which can degrade fish spawning grounds. Try to sweep up between storms.

The problem is, sand, wood ash, and

kitty litter sometimes just don't cut the mustard, especially if there are folks around who are unsteady on their feet. Tulsa, Okla., banned salt de-icers in the winter of '85/'86 out of concern for the environment, but reverted to using them the following year because of a sharp increase in car accidents. If you need to melt your ice, try a product called saf-t-thaw (see "Keepers" Jan/Feb 1991), whose patented "crystalline amide core impregnated with a glycol ad-mixture," gets the job done for a few more bucks than you would pay for salt. While the formulation may irritate your eyes and skin, the EPA has said that it "does not pose a hazard to the environment." For more information, call Performance Industries, Inc. at (800) 783-7841.

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JOHN L. AYLOR
Mechanicsville, Va.

THE REASON ENVELOPES (AND MANY OTHER things) are banned from some recycling bins has less to do with technology than with economics. Paper brokers who collect from office recycling programs are often trying to sell a high grade of paper to the mills. Contaminants — which some envelopes are and some aren't — will lower the price the broker can get, or make her less competitive with other brokers selling cleaner batches. The broker probably decided it would be easier to ban all envelopes than to bother people with the distinction between acceptable and unacceptable ones, thereby risking high contamination rates.

Plain envelopes with water soluble glue (the kind you lick) almost never pose a problem at the paper mill. The vast majority of mills wash and deink their feedstock, which flushes water-soluble glue out of the pulp. Old-fashioned glassine (cellulose) windows are repulpable, as they say in the biz, and most mills can handle envelopes with them. Plastic windows, though, are harder to deal with. Many mills have a device that separates out non-fiber contaminants like these plastic windows (and, say, rubber bands) from the pulp, but too many in a batch will overload the system and add to costs. Envelopes that seal with pressure-sensitive glue are the worst, because the PS glue globs together and accumulates on the wire screens at the mill. The globs can find their way into the paper as shiny spots or holes, and they necessitate frequent cleaning of the screens. At worst they can cause a major break in the paper sheet during manufacturing, causing everything to come to a screeching halt.

Some recycled paper products don't require high-grade feedstocks, and the mills that make them can handle all sorts of things that would be unacceptable to other mills. Marcal paper in Elmwood, N.J. [(201) 796-4000], for instance, makes tissue products from mixed-paper grades. They accept envelopes, magazines, stick-pads ... the whole mishpacha. To find a paper company or broker in your region that accepts mixed paper, contact the American Paper Institute,

260 Madison Ave., New York, NY
10016; (212) 340-0600.

Blue Box, Blue Bag: What's the Difference?

My town recently started curbside recycling. I had always heard of blue bins being used to collect recyclables, but here we buy blue plastic bags at grocery stores. Why would a town go with blue bags over blue bins?

BARBARA BLUMENTHAL
Saginaw, Michigan

THERE ARE OVER 130 MUNICIPALITIES IN THE country that have decided to take the blue-bag route, or are giving it a trial run. Bags do have advantages over bins. Homeowners buy them at convenience stores or supermarkets, thus relieving municipalities of the cost of purchasing and distributing bins. The bags can be collected in traditional garbage trucks, averting the purchase of new recycling trucks. Because the step of bringing the empty bin back to the curb is eliminated, the bags also cut down on collection time. (That time savings is balanced by time needed to sort the bags at the MRF or processing center. The MRF worker's time, however, is usually cheaper than the collector's.) The bags also keep recyclables drier and cleaner, and reduce pest infestation.

From the homeowner's perspective, the bag fits more easily into kitchens, whereas bins often end up stowed inconveniently in the garage. Also, if you fill up a bag, you have the option of using a second or third one. If you fill up your bin, you're stuck. And, not least of all, homeowners don't have to retrieve an empty bin from curbside.

The drawback of the bags is obvious: They contribute to the waste stream. Where a bin can be used many times before kicking the bucket, a bag is a single-use item. And it has been theorized that making people pay for the bags drives down participation rates. Webster Industries in Peabody, Mass., markets a blue bag with 30% post-consumer recycled content; all of the companies marketing blue bags say they are trying to develop recycling programs to recycle the bags after use.

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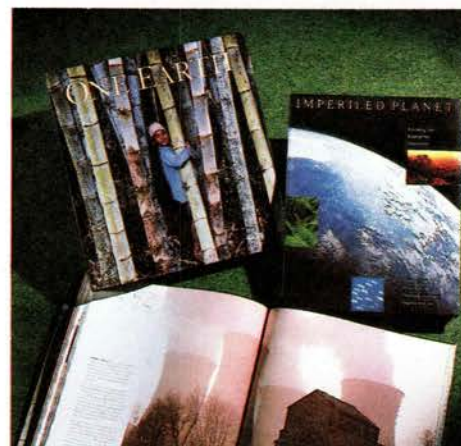
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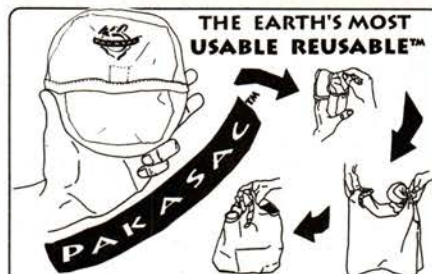
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EXAGGERATING TO CALL ATTENTION: IT'S A COMMON HUMAN trait, and it's something hot-and-bothered environmentalists are often accused of. Despite the growing sophistication of environmental rhetoric, the exaggerations continue, along with other forms of myth-mongering. Such misleading nonsense belongs in the dumpster.

A Greenpeace ad in the *New York Times* (October 5, 1992) is an unfortunate case in point. Headlined "Ozone Shock," the ad calls for a boycott of Du Pont based on questionable science. In the ad, expanded polystyrene food containers are listed as a source of ozone-depleting chlorofluorocarbons (CFCs). U.S. foam food packaging is not blown with CFCs. Greenpeace — a worldwide presence, not a sixth-grade ecology class — knows this. But the truth should not

get in the way of a do-good tantrum.

Besides delivering misinformation to the public, the ad makes Greenpeace look dumb to anyone who knows better. If Greenpeace, or any other environmental group, is seen as deceitful and hysterical by intelligent readers, then all environmental activism is tarnished.

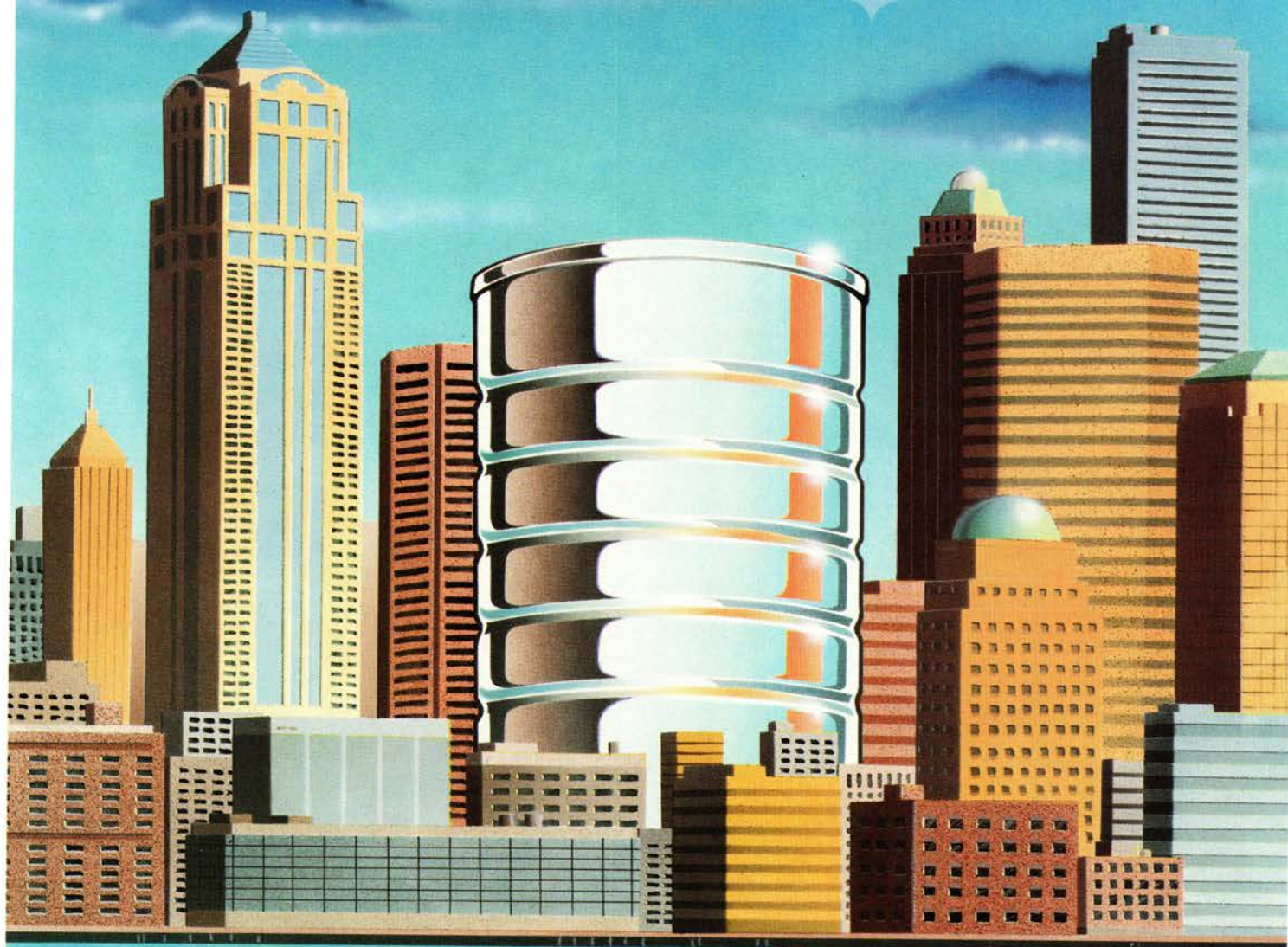
In another sort of exaggeration, environmentalists have been charged with peddling fear as a tool for

fund-raising and activism. Greenpeace doesn't help with their inflammatory copy: "There will be no jobs on a dead, scorched Earth, and no people either." It is very easy to imagine a cynic supposing that the copy is there not to educate, but to motivate us into clipping the membership coupon.

In a free society dependent on an informed public, the ends do not justify the means. Anyway, when it comes to the agendas of environmentalist bureaucracies, even the ends they have in mind should be questioned. Get with it, Chicken Little: Rational debate and good science will be increasingly more effective than emotion, fear-mongering, and simplistic calls to action.



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Join us in shaping the products of tomorrow. Call **1-800-YES-1-CAN** (1-800-937-1226) for the steel can recycling locations near you.



Steel Can Recycling Institute

680 Andersen Drive, Pittsburgh, PA 15220



CAVE • men, *acronym*— Citizens Against Virtually Everything. As righteous sons of NIMBY (Not in My Back Yard), CAVEMEN guarantee Cro-Magnon-like resistance to LULUS (Locally Undesirable Land Uses). Their credo: BANANA (Build Absolutely Nothing Anywhere Near Anything).

It's no news that CAVEMEN go ballistic when plans for a landfill or an incinerator are unveiled. Dade County, Florida, CAVEMEN even terrified county commissioners into closing the nation's largest composting plant, complaining that it smelled. But their outrage isn't limited to matters of garbage.

In Richland, Washington, CAVEMEN protesting "visual pollution" are battling the Pacific Northwest's first large-scale wind generating project. And in Sonoma County, California, fear of privacy invasion is spurring local property owners to fight restoration of the Santa Rosa Creek. One might think that the entire community would rally around a plan to transform the littered creek into a rejuvenated urban waterway lined with public greenways and bike paths. One would be wrong.

The backlash prompted Keith Woods, executive director of the Santa Rosa Chamber of Commerce (which supports the restoration), to decry knee-jerk resistance to public-development projects. In the first reference to the term that we're aware of, he used the politically correct plural — "CAVEpeople" — in a *San Francisco Chronicle* report.

Mr. Woods warns that the CAVEMAN mentality bespeaks a national trend. "There's almost no such thing anymore as making a genuine sacrifice for the community good," he told us. "Instead, we get opposition simply for the sake of opposition. Try to build the Golden Gate Bridge today? Good luck."

